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RESIDENTIAL WASTE COMPOSITION STUDY

VOLUME I OF THE ONTARIO WASTE COMPOSITION STUDY

JANUARY 1991

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VOLUME I OF THE ONTARIO WASTE COMPOSITION STUDY

Report Prepared By:

Gore and Storrie Limited
in association with
Decima Research Limited

Report Prepared For:

Waste Management Branch
Ontario Ministry of the Environment

JANUARY 1991
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INFORMATION FOR THE READER

The results of the work will appear in three volumes.

Volume I contains the results of the residential portion of the Ontario Waste Composition Study and are presented herein. The emphasis in Volume I is on the development and testing of a method that municipalities can use to estimate per capita generation rates of residential refuse.

The following kinds of information on municipal waste are also included in Volume I: inorganic chemical analyses of vacuum cleaner bag dust (Town of Fergus and Borough of East York); moisture content of combustible materials separated from residential refuse (Town of Fergus and Borough of East York); BTU content of several mixed plastic wastes; waste composition and per capita generation rates of several schools (Borough of East York); and a survey of disposal of white goods and bulky items in several Ontario municipalities.

Volume II will report the results of the Commercial Waste Composition Study.

Volume III will be a " user friendly " manual that will outline the procedures for conducting residential and commercial waste composition studies in municipalities of Ontario.

ABSTRACT

Volume I, The Residential Waste Composition Study, is the first of three volumes representing the Ontario Waste Composition Study.

The Residential Study focuses on developing a cost effective method for carrying out a waste composition analysis. This method facilitates the collection of waste composition data and per capita waste generation data.

The Residential Waste Composition Study took place in the following municipalities. The Town of Fergus (population 6,757) between July 15 and August 31, 1989; The Borough of East York (population 101,085) between October 24 and December 28, 1989; and The City of North Bay (population 51,313) from February 21 - 28 , 1990.

The method used in the study is based on the hypothesis that the characteristics of a residential waste stream are related to the socioeconomic lifestyles of people and the demographic characteristics of a municipality.

Statistics Canada information about the population of a municipality provides subunits of the population, known as Enumeration Areas (EAs). Each EA on average contains 600 people. Using the most recent Statistics Canada Census data each EA of the studied Municipalities were stratified according to income level (high, medium, or low). Within every income category each EA was further classified according to housing type. Statistics Canada reports on the number of single detached, apartments and other residences for each EA. From the income and housing type information, an income/housing sample matrix table was designed, defining the EAs to be sampled.

Based on a random numbering sample selection procedure for residential dwellings of a defined EA, the study team followed a sampling program in which refuse was collected, sorted into various waste composition categories (i.e.

papers, plastics etc.), and weighed. Although the sampling method may vary based on housing type, in general, ten 100 kg. samples (minimum weight) were collected per day. Blue Box materials and yard waste, if present, were also collected but weighed separately. Total weights of refuse samples were measured for per capita waste generation data. White goods and bulky waste were also analyzed within the scope of the study.

The Residential Study demonstrated a cost effective waste composition and generation rate procedure that uses readily available equipment and that can be implemented by municipal staff.

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EXECUTIVE SUMMARY

The two-fold purpose of the residential portion of the Ontario Waste Composition Study was to:

1. develop a simple, cost effective and statistically reliable method for determining the composition and per capita generation rate of waste from residential sources in Ontario municipalities; and
2. apply the method in several municipalities and obtain current information on the characteristics of residential waste streams.

On the strength of a pre-study literature survey, summarized herein, it became apparent that residential waste generation was a function of the socio-economic and demographic characteristics of a population. Indeed, any assessment of the residential waste generation characteristics of a municipality should take population demographics into consideration.

While the number of socio-economic and demographic parameters that one could incorporate in a study of residential waste generation is very large, time and budget dictated that the parameters in the present study should be restricted to two principal parameters: income level and housing type. Statistics Canada provides census data with respect to these parameters for municipalities across the country and this kind of information was obtained for the three municipalities participating in the waste composition study in Ontario: the Town of Fergus (population: 6,757); the Borough of East York (population: 101,085); and the City of North Bay (population 51,313). The field studies were conducted in the three municipalities during the following periods: July 15 to August 31, 1989; October 24 to December 28, 1989; and February 21 to February 28, 1990 respectively.

Statistics Canada provides socio-economic and demographic information on small geographical sectors of municipalities called Enumeration Areas (EAs) that typically have a residential population of 600-800 persons. Some apartment

buildings may have a large enough number of units that they are designated as EAs unto themselves.

In the work reported herein, the EA was the basic population unit whose waste composition and per capita generation rates were studied as representative segments of the entire municipal population. First, all of the EAs in the municipality were classified in a three-by-three, two dimensional matrix of:

> Average annual income: high, medium, and low; and
>
> Housing type: single detached dwellings, predominantly multiple dwellings (apts.), and predominantly mixed (detached apts.).

This classification matrix resulted in nine possible combinations of income levels and housing types with each combination termed a "cell". One EA was randomly selected from each cell, unless the cell contained few or no EAs, which was often the case for the low income detached dwelling cell. The residential waste assessments in the Town of Fergus and the Borough of East York were based on data from EAs that were representative of the EA distribution in the income/housing matrix for the respective municipalities. Based on the results of these two municipalities, it was decided to conduct a reduced sampling program in the City of North Bay.

After the Study EAs in the municipality were randomly selected, a curbside refuse sampling plan was designed, based on a procedure that assigned random starting points for refuse collections at street intersections throughout the EA. For each EA, both the number and weight of the refuse samples that had to be collected and sorted in order to obtain the statistical accuracy that we wanted to achieve for the kitchen waste fraction (only) of residential waste was based on the pioneering work of Dr. A. Klee and co-workers. The sample number was nine per EA and the minimum sample weight was 100 kg. To achieve similar levels of statistical accuracy for waste components occurring at lower concentrations in the waste stream (for example, glass and ferrous

metals), a greater number of samples, which may be economically impractical, would be required.

It took a crew of four, approximately 5.5 days to collect and sort the bagged refuse and Blue Box materials in a single EA. Records were kept of the number of dwellings from which bagged refuse and Blue Box materials were collected in order to compute estimates of total residential waste generation on a per capita basis, using Statistics Canada data on the average population per dwelling in the EA. Blue Box materials were sorted, weighed and recorded separately in order to estimate the capture rate of certain recyclable items from the residential waste stream.,

Yard wastes were weighed and recorded whenever they were encountered, but this waste stream was not included in the computations of the residential waste composition and the weight was not included in the estimates of per capita generation rates either, for seasonal generation reasons discussed herein.

The moisture content of the combustible fractions of the waste stream was determined by drying. The BTU content of some mixed plastics (laminates), as well as disposable diapers, was determined by bomb calorimetry. Samples of vacuum cleaner bag dust were analyzed for heavy metals.

Special sampling procedures were devised for those apartment buildings where the waste was compacted in containers. Samples of the required weight were removed from the containers for the waste composition analysis. Then the residual contents were collected and weighed, courtesy of special arrangements made with a local waste hauler and transfer station scale house.

The weekly waste streams for seven schools in East York were also collected and the waste composition was determined. Per capita generation rates for the student body and total staff were computed.

A survey was also conducted to assess the yearly tonnages of white goods and other bulky items generated by residential areas in 10 municipalities in Ontario.

The methods developed and used in this study were found to be cost effective and capable of being used by municipal staff. Recommendations are presented to further refine and improve the methods used.

Ontario municipalities are encouraged to use the methods demonstrated in this study to satisfy municipal needs, to generate further data on a consistent province-wide basis and to assist in assessing the effectiveness of new waste management programs and identifying trends in waste composition and generation rates.

Conclusions:

The results of the residential waste study presented herein lead to the following conclusions.

1) Municipalities in Ontario are implementing a number of waste diversion options for residents -- notably, Blue Box and backyard composting -- as the waste management strategies of municipalities continue to change. As the number of waste diversion options increase, the chances of obtaining an accurate baseline of waste generation data decreases. Where there was formerly a single waste stream coming from residences on a predictable and scheduled basis, now there may be two or more curbside waste streams, and possibly another stream directed to a backyard composter. Therefore, there is more potential for error in waste composition studies conducted in municipalities that are aggressively pursuing waste diversion programs (e.g. Fergus and East York) than in those that have yet to implement such programs --- and where there is still a single residential waste stream.

2) Given an understanding of the reality of residential waste stream partitioning noted above, the residential waste assessment procedures for detached dwellings included an estimated allocation for Blue Box materials. Waste assessment of residential populations residing in multi-unit dwellings (apartments) presented additional challenges in data collection. Per capita waste generation rates were obtained for both residential groups; however, a need for improvement in sampling procedures was identified for large apartment buildings (East York) where refuse was compacted.

3) The per capita waste generation rates (excluding yard wastes and bulky items) for the three municipalities appeared to vary with population: Fergus 0.80 kg/capita/day; North Bay 0.93 kg/capita/day; East York 0.99 kg/capita/day. However, municipal population per se is probably only a superficial correlate and not causally related to the waste generation process. For example, the weight (kg) of the newspapers collected in East York, versus Fergus, may partially explain the higher per capita generation rate (kg/person/day) in East York (Table 14). Some of the difference may also be attributed to seasonal factors.

4) The method used in the Study has revealed apparent differences in the per capita waste generation rates within income groups. More waste (excluding yard waste and bulky waste) appears to be generated by residents of detached dwellings than by apartment dwellers (Table 22). However, no easily discernable pattern could be detected in the per capita generation rates between different income groups. More detailed sampling in each municipality would be needed to determine any potential income effects on waste generation characteristics.

5) It is interesting to note that there is very little difference in average per capita generation rates of kitchen waste for Fergus, North Bay and East York. The respective values are: 0.23, 0.24 and 0.25 kg/capita/day (Table 22).

When the kitchen waste fractions were computed as a percent of the total composition of the residential waste stream, Fergus showed a higher percentage than East York and North Bay: Fergus 28.8 % versus, East York 25.5 % and North Bay 26.0 %. Again, larger quantities of other components in the East York and North Bay residential waste streams (e.g. newspapers) may explain the lower percentage (or relative proportion) of kitchen waste in the refuse.

(6) Reliance on "waste composition percent" as the sole means of characterizing waste can be misleading and create more questions than are actually answered. The per capita generation rates of the total waste stream and its components are more important for planners of municipal waste management programs.

7) The study demonstrates a cost effective residential waste assessment method that uses readily available equipment and that can be implemented by municipal staff.

Recommendations:

Municipalities conducting a waste composition study might consider the following recommendations when designing the sampling protocol and implementing the study methodology.

1) For sampling and sorting convenience, municipalities may choose to conduct the waste composition studies in late spring or mid fall when refuse odours are less intense and maggots are less frequently encountered. According to Vesilind & Rimer (ref. 47), the average residential waste composition does not vary by more than ± 10% over three quarters of the year. Therefore, aesthetics of the working conditions can be taken into account without risk of obtaining skewed

data. The inclusion of yard waste in overall residential waste composition percent profiles should be avoided so that baseline composition percentages are not misrepresented.

2) Municipalities may choose to set up independent collection systems to study the seasonal generation of yard waste and leaves. This would require a coordinated effort between garbage collection personnel, private horticultural firms and other agencies generating and collecting these waste streams.

3) In order to avoid the sampling problems that we encountered with the large apartment buildings in East York, where apparent sampling biases were difficult to avoid, arrangements could be made, for example, with 30 units within the building to participate in a refuse study. This would give a more accurate appraisal of the waste composition in these large apartment buildings. As a check, the method described herein for obtaining the per capita generation rate for the entire building could then be compared with the per capita generation rate for the 30 units.

4) Municipalities in Ontario should follow the waste composition procedure in conducting their own waste composition analysis, for reasons of consistent data generation using a cost effective approach. Periodically, municipalities should conduct additional waste composition studies to monitor trends in residential waste management and the effectiveness of waste management programs.

SECTION 1

PREFACE AND BACKGROUND LITERATURE

1.0 PREFACE & BACKGROUND LITERATURE

1.1 Preface

With a view to OUR COMMON FUTURE (ref. 49) and a framework for a sustainable lifestyle, the by-products of industrialized nations must be responsibly managed. The Ontario Ministry of the Environment set two targets for the diversion of solid wastes going to landfill sites in the Province: a 25% diversion by 1992 and a 50% diversion from disposal by the end of the century. The methods that may be used to achieve these goals involve the "3-Rs": Reduce, Reuse and Recycle, and include composting but exclude incineration. Landfill crises are at hand in some Regional and area municipalities in Ontario and many waste disposal sites are close to their capacity. Similarly, in the United States, where 30% of the country's landfill sites will be filled and closed within 5 years, the United States Environmental Protection Agency has initiated an "Agenda for Action" (ref. 46). This program also encourages a maximum effort to divert wastes by prudent implementation of "3R-s" programs.

The development of plans to divert materials from landfill sites requires knowledge of the qualitative and quantitative composition of solid waste streams from residential, commercial and industrial wastesheds. The design of materials recovery facilities and centralized composting facilities that will receive, process and store (short term) components in the waste stream, must be scaled to the per capita waste generation rate of the wasteshed population served by the facilities.

The Ontario Ministry of the Environment contracted Gore & Storrie Limited, in association with Decima Research Limited, to develop quantitative methods that could be used by any municipality in Ontario to assess solid waste generation. The results of the residential portion of the Ontario Waste Composition Study are presented herein.

The residential report is divided into two main parts. The first part reviews the relevant literature (Canadian and non-Canadian) on the following topics: residential waste composition, per capita waste generation rates, some of the methods that have been used in earlier waste composition studies and some of the pit-falls in methods and data handling.

The second part describes the methods used to determine the residential waste compositions and per capita waste generation rates in three municipalities in Ontario: the Town of Fergus, the Borough of East York and the City of North Bay. Also included in the report are data on: solid waste composition and per capita waste generation rates for schools; chemical analyses on vacuum cleaner bag contents; the moisture content of combustible components in the residential waste stream; the heating value (kJ/kg content) of selected mixed plastics and disposable diapers; and a survey of some Ontario data on the generation rates of white goods and bulky items.

1.2 Background Literature

1.2.1 Canadian and Ontario Studies

The Bird & Hale Report (1978)

The acknowledged landmark of waste composition studies in Canada was the work reported by Bird & Hale (cited herein as, BH) in 1978 (ref. 5). Eleven cities were selected with populations in excess of 100,000 from across Canada. The average annual composition of municipal solid waste* entering landfill sites, transfer stations and incinerators, was derived from samples obtained during the spring, summer, winter and fall. In Ontario, Toronto was selected for the study. Twelve visits were made to six sites between October, 1976 and September, 1977, with 2 visits apiece at: Commissioners Street Incinerator, Ingram Incinerator, Dufferin Incinerator, Beare Road Landfill Site, Bermondsey

*municipal solid waste = residential + commercial

Transfer Station and Wellington Incinerator. Sample weights of municipal solid waste ranged up to 400 lbs. (180.7 kg).

The Ontario results of the BH waste composition study, averaged over the year (Table 9 in ref. 5), are shown herein in Tables 1 and 2. The per capita waste generation rate is given in Table 3. It should be pointed out that while we are using the BH data as a "standard" for comparative purposes, the Peter Middleton & Associates report of 1975 (ref. 32) summarized the results of 31 previous studies (United States & Canada), including 4, early 1970's studies from Ontario. Peter Middleton & Associates (ref. 32) noted that their review of waste composition studies was hampered by "six distortion factors": (1) the "solid waste" that was being studied; (2) the geographic location of the study; (3) the season of the year when the study was undertaken; (4) the year of the study; (5) the socio-economic background of the area where the "solid waste" for the study was generated; and (6) moisture transfer that occurred before sampling.

Giving "consideration" to these six factors, Peter Middleton & Associates tabulated "...the following percentage figures...developed for the average yearly composition by weight of <u>residential</u> solid waste in Southern Ontario on an "as generated" basis - 1974:

	(%)	
Paper	35	
Food Wastes	22	
Yard Wastes	15	(ranging from 0 - 20 over 12 months)
Plastic	3	
Rubber and leather	2	
Cloth	2	
Wood	3	
Glass	8	
Metal	8	(ferrous 7, non-ferrous 1)
Other Misc.	2	
	100	

These figures are considered to be accurate to within 20%..."

TABLE 1: WASTE COMPOSITION DATA FOR ONTARIO

COMPONENT	LITERATURE SOURCE OF WASTE COMPOSITION INFORMATION (see footnote 16 below)														
	A	B	C	D[1]	D[2]	E	F	G	H	I	J	K	L[12]	M[13]	M[14]
Paper	39.8	44.94	35											39.1	28.2
Kraft		10.75		5.3[4]	7.5[4]	9.0	3.0[4]				2.6				
Newsprint		10.61	10	12.1	12.7		16.3	14.4	15.2	9	16.4	9	5.7		
Fine Paper	6.0	8.07		1.5	1.8	6.0	1.5				1.9				
Other Paper	12.0	15.50		23.3	10.4	12.0	9.8	20.6	10.6	27.0	12.9	31	20.9		
Glass	NW[3]	6.55	8	6.1	7.3	8.0	8.3	5.0	7.0	8.0	6.5	7	15.2	7.7	10.8
Beer containers		0.04													
Returnable softdrink		0.23													
Non-returnable softdrink		1.33													
Liquor and wine		1.53													
Containers-food		1.98													
Containers-other		0.30													
Flat and cullet		1.15													
Ferrous metals	4.4	5.49		5.4	8.7	2.5			2.3	7.0	4.6[6]	6[6]	13.4	3.9	5.6
Beer cans		0.0				4.5		5.2							
Softdrink cans		0.88													
Food cans		2.61													
Other		2.01						0.5							
Non-ferrous Metal		0.89	8[6]	0.7	0.3		2.0[6]	0.7	1.2	1.0				0.6	1.2
Aluminum	0.2	0.85				0.95							3.8		
Other	0.1	0.04											0.2		
Plastics	1.7	5.72	3	9.5	8.4	6	0.9	5.0	3.5	6.0	4.9	5	11.6	6.1	10.8
Container		1.05				1.75									
Sheet film other		4.67				4.0									
Ceramics rubble		1.82									0.7				
Wood (lumber)	1.3	3.36	3	1.5	0.0	4.0	0.7	3.0	1.8	4.0	0.6			1.0	10.8
Food wastes	21.8	22.59	22[7]	17.7[7]	30.4[7]	7.0	40.9[8]	22	24.6	7.0	27.5	30	23.9	27.9[8]	30.1[8]
Textiles/leather/rubber/	2.6	4.11				4.0	1.0[10]	4.0	1.8	4.0	2.3		1.7		
Yard wastes	19.9	3.29	15	7.2	0.0	20.0		15.0	17.0	20.0	4.9	9			
Fines		0.93									4.3		0.8		
Petrolleum chemical mix		0.31													
(other combustables)				2.7	4.1										
(other non-combustables)				3.6											
(miscellaneous)	8.8		2			6.0	0.1[11]	4.6	15.0	6.0	7.5[15]	9		13.6	11.9
Hazardous wastes						1.0			0.6	1.0	0.3				

[1] detached single family

[2] apartments

[3] counted but not weighed

[4] brown paper / corrugated

[5] boxboard only

[6] ferrous / non ferrous

[7] food only

[8] food / yard waste

[9] rubber / leather

[10] textiles only

[11] batteries

[12] Presqueile Park, Ont.

[13] Average of Quebec Municipalities

[14] Average of study in La Salle, P.Q

[15] Sanitary napkins, disposable diapers, pet droppings, ashes, vacuum cleaner bags

[16] Literature sources of the waste composition data for Ontario

- A - Barton (1976) (MSW)
- B - Bird & Male (1978) (MSW)
- C - Ontario Waste Management Board (1980) (MSW?)
- D - Evans (1985) (residential)
- E - RIS (1987) (?)
- F - Perks (1988) (residential)
- G - Recycling Advisory Committee (1989) (?)
- H - Green Cone Inc. (1989) (?)
- I - OMMRI - II (1990) (?)
- J - City of Guelph (1990) (residential)
- K - SWEAP (1990) (residential)
- L - Flindall (1988) (prov. park)

[16] Literature sources of waste composition data for Québec

- M - GIUROU / GRAIGE (1988) (residential)

TABLE 2: WASTE COMPOSITION DATA FOR THE UNITED STATES & EUROPE

COMPONENT	LITERATURE SOURCE OF WASTE COMPOSITION INFORMATION (see footnote 19 below) A	B[1]	B[2]	C	D	E	F	G	H
Paper	44.94	31.3	43.1 6.5[3]	30.0-60.3		35.6	41.0	22.5	
Kraft paper	10.75				7				
Newsprint	10.61				7				16.41
Fine Paper	8.07								
Other Paper	15.50				20				4.3
Glass	6.55	9.7	7.5	4.5-10.9[4]	7	8.4	8.2	6.9	14.4
Beer containers	0.04								
Returnable softdrink	0.23								
Non-returnable softdrink	1.33								
Liquor and wine	1.53								
Containers-food	1.98								
Containers-other	0.30								
Flat and cullet	1.15								
Ferrous metals	5.49	8.5	4.3			8.9[12]	8.7[12]	3.8[12]	2.8
Beer cans	0.0								
Softdrink cans	0.88		5.2[5]						
Food cans	2.61								
Other	2.01				5[6]				
Non-ferrous Metal	0.89		1.5						0.4
Aluminum	0.85	0.6			1				
Other	0.04			6.7-9.8[7]					
Plastics	5.72	3.4	1.8		9	7.3	6.5	6.0	5.2
Container	1.05								
Sheet film other	4.67			1.3-4.6[8]					
Ceramics rubble	1.82								
Lumber	3.36	3.7	3.5	1.0-3.8					
Food wastes	22.59	17.6	9.5[9]	10.1-22.5[9]	8[9]	8.9	7.9	38.0 1.7[13]	25.7[15]
Textiles/leather/rubber/wood	4.11	2.6[10] 1.4[11]	1.0[10] 0.7[11]	0.6-2.0[11]	3[11]	9.0	8.0 (8.1)	2.2[14] 2.0[10] 2.8[11]	1.8[11]
Yard wastes	3.29	19.3	14.3	5.2-35.7	31	20.1	17.9		
Fines	0.93			3.0-8.3					22.2
Petroleum chemical mix	0.31								
(ash/dirt/rock)			1.1	1.0-11.0				3.0	1.8
(miscellaneous)		1.5		0.5-3.0		1.8	1.8 (1.6)	12.0	1.9[16]
(all other)					2				3.0[17] 0.3[18]

1 from Table 1-2
2 from Table 4-2
3 cardboard only
4 glass / ceramics
5 tin cans only
6 other metals
7 metals only
8 plastics / rubber
9 food only
10 rubber / leather
11 textiles only
12 total metals
13 bones
14 wood
15 "organics"
16 disposable diapers
17 composite materials
18 household toxics
19 American literature sources for waste composition information

A - Bird & Hale (1978) (MSW)
B - Tchobanoglous (1977) (MSW)
C - EMCON Associates (1980) (MSW)
D - Matrix Management Study (1987) (residential)
E - Franklin Associates (1988) (MSW)
F - Kashmanian (1989) (MSW) (numbers in brackets are U.S.EPA: Agenda for Action 1988) (MSW)
G - Blattert (1988) (?)
H - Franke (1987) (residential)

TABLE 3: SUMMARY OF PER CAPITA WASTE GENERATION RATES

Ref.	Location	Lbs.[1]/capita/day	Refuse
5	Canada	2.82	Combined residential and commercial
43	U.S.	4.29	"
43	U.S.	4.05	"
43	U.S.(revised)	3.31	"
27	Seattle	2.3	Residential
30	Ontario	2.2[2]	"
28	U.S.	3.78	Combined residential and commercial
28	NE Michigan	4.32	?
28	Ingham Co, MI	2.3	?
28	Ann Arbor, MI	4.2	?
28	Nottingham, MI	2.12	?
23	U.S. (1990)	3.7	Combined residential
4	Kingston, Ont.	2.09	"
2	Canadian (1989)	4.62	"
	U.S. (1989)	3.59	"

[1] 1 lb. = 0.454 kg.

[2] Reportedly obtained from: Urban Solid Waste Generation Ontario, July 1976, Ont. Waste Management Advisory Board, pg. 1.

While the wide scope of the BH study understandably precluded a greater attention to sample size and sample number, two problems with respect to the BH procedures require some discussion in view of the major objective of the present Study: the development of a method for determining residential waste composition and per capita waste generation rate.

First, BH attempted to convert the weights of the sorted materials from a, so-called, "as received" condition, to a weight which more closely reflected the items in their original, or "as generated" state. While the "as generated" concept is a valid one, it is not possible to compute this value using predetermined factors in conjunction with the equation provided on page 10 of their report (ref. 5). The following discussion will point out some of the complexities that BH were attempting to address.

When moist organic matter comes into contact with dry materials (e.g. plastic, boxboard, or paper) there is a transfer of water from the organic matter to the surface of plastic packaging (=adsorption) or, for example, throughout the entire thickness of a piece of boxboard (=absorption), causing it to swell. Hence the organic matter loses weight, while the other materials gain weight. Under ideal (laboratory) conditions, the weight transfer of the water can be measured. Practically speaking however, the heterogeneous assemblage---and juxtaposition---of wet and dry materials in the average bag of residential refuse poses a much more complex problem than simple moisture transfer between the initially wet and the initially dry components.

Moist organic matter may also be found as a residual layer on surfaces of containers---metal, plastic, glass; or partially absorbed by paper products. The weight of this "tramp" organic matter cannot be "universally predetermined", but must be quantified for every case. The following example further serves to illustrate the complexity of the "as generated" problem.

The moisture content associated with a discarded can of spaghetti sauce, in which a thin layer of sauce is still adsorbed to the inner surface, is a function of the physical-chemical properties of the organic matter in the sauce, as well as the thickness of the sauce coating. In essence, it may be argued that the presence of the organic matter in the sauce increases the <u>apparent</u> amount of water adsorbed to the surface of the can. Put simply, a dirty can will have more moisture associated with it than a clean one. Thus, the weights of materials that we collected in the Study are reported in their "as received" condition; we did not attempt to derive any "as generated" weights.

It is difficult to justify pursuing this level of theoretical detail at the expense of time requirements and financial limitations which control the pursuit of the practical objectives of a waste composition study. Brunner & Ernst (ref. 8) alluded to this point while reporting that tramp organic matter may contribute significantly to the total organic fraction of the waste stream.

The second problem, illustrated by BH's inclusion of yard waste data in the calculation of percent (%) composition (Tables 1 & 2), concerns the misleading impact of quantitatively apportioning a "spurious event" over a time period which exceeds the actual duration of that "event". Again, Brunner & Ernst (ref. 8) may be cited for a relevant example: the mercury (Hg) content from a single battery that was mathematically apportioned over an entire load of refuse as if this were the true "background" level of Hg in all of the constituents of the load. The amount of mercury measured is, however, relative only to the battery and <u>not</u> the entire load.

In Ontario, yard wastes and leaves are not part of the residential waste stream throughout the year. The quantities of these materials in the waste stream not only vary with season but their occurrence in a municipality also varies with population demographics: detached residential dwellings versus apartments; young versus mature trees lining streets, etc. Over and above the false notion conveyed by incorrectly "weighting" seasonal components over the entire year,

as in the mercury example above, there are several equally inaccurate, practical consequences.

First, there is an important mathematical result when yard wastes are included in the calculation of percent composition of the more or less "baseline" components of the residential waste stream, e.g., food waste, Blue Box components, etc. When all of the components of the waste stream are normalized to the total ,i.e., the percentage of each component is computed as a proportion of the total, the inclusion of yard wastes as a component causes the other components in the refuse---which are present in the refuse throughout the entire year---to appear to be less abundant than they actually are. Brickner (ref. 7, Table 2) demonstrated the effect of eliminating yard waste from composition calculations. The seasonal waste composition results of Constantine et al. (ref. 11, Table 1) would similarly change if the yard waste component were removed. This computational problem will re-appear below.

Second, the design of a waste management facility will be different, depending on whether the arrival of the waste is spread out over an entire year or delivered in several large loads over a few weeks.

Other Studies

Two reports are briefly reviewed here because they feature either a provocative experimental design or a design that appears to have lead to a problem in data interpretation.

In 1984, the Toronto Recycling Action Committee commissioned an interesting study (ref. 16) to compare the composition of refuse generated on the basis of land use, ie., residential, retail, restaurants and an office tower. The residential sampling strategy was well conceived; residential refuse was collected from two streets in Toronto and per capita generation rates for this wasteshed population could have been readily determined. In addition, the refuse from the commercial

establishments was collected at the premises so that both per capita and land use calculations of waste generation could have been made. The report was published in 1985 (ref. 15). The concept of the curbside collection of residential refuse was central feature of the sampling plan developed in the present Ontario Waste Composition Study.

In the spring of 1988, Pollution Probe Foundation studied the waste generation of 68 households in Toronto to determine the quantity of recyclable components (ref. 31). As the sampling program evolved in complexity from the beginning to the end of the study (in step-wise fashion), a problem appears to have been encountered in the presentation of waste composition data. (See Table 4 of the "Hoggs Hollow" report (ref. 31, p. 16)). Newsprint was the only item partitioned from the total household refuse in week two of the study and it was reported as 23.7%. In weeks 3 through 8, when other components, in addition to newsprint, were separated and weighed, the percentage(%) of newsprint dropped to the following values: 17.3, 13.4, 16.9, 13.7, 20.9 and 13.9%. It is highly unlikely that the sudden decrease between weeks 2 and 3 was due to a reduction in newspaper readership or subscriptions. Insufficient quantitative information was provided to clarify and interpret the data presented in the table. A discussion of the presentation of waste composition data in the "percentage" format is given in Section 4.4

As a miscellaneous note, the important topic of "capture rate", ie., the <u>actual</u> quantity of recyclable materials collected via the Blue Box program versus the <u>potential</u> quantity of recyclable materials in the curbside refuse, is presented in Table 5 (p. 17) of the Pollution Probe report. Unfortunately, this table is not referred to in the text and according to the author of the report (pers. commun., G. Perks), no capture rates were determined for any of the households. Intended to serve an illustrative purpose, the table requires textual comment in order to prevent confusion.

Summary of Waste Composition Data For Ontario

Table 1 herein, presents the waste composition data obtained from formal and "informal" literature (post Peter Middleton & Associates review of 1975). It is difficult to judge the completeness of the original data that may have been generated since the BH report. For instance, some Waste Management Master Plans (not cited herein) seem to have applied (and changed, without explanation) the BH data. BH waste composition categories are reported with no changes in this report in Tables 1 and 2 and their results are shown in Column B of Table 1 and Column A of Table 2.

With the exception of columns L and M/M, ie., waste compositions for Presqu'ile Provincial Park and MSW in Quebec, respectively, the data pertain to both MSW and residential waste streams in Ontario, or other "combinations" of information.

On the basis of problems that were already alluded to above---and which will be discussed more completely in Section 4.4---the literature data presented in Table 1 cannot be easily compared. However, it is interesting to note that the values reported for food wastes are generally in the 20% range, with the exception of particularly low values of 7%, in columns E and I, (refs. 39 & 29). RIS (ref. 39) identifies their sources as: "compilation of data from U. S. Environmental Protection Agency, Environment Canada, Waste Sampling Study for the City of Windsor and Waste Composition Literature Reviews performed by State of Rhode Island and Massachusetts."

Residential Plastic Waste

The recent EPIC (Environment and Plastics Institute of Canada) study of post-consumer generation of rigid plastic container waste in Barrhaven, a residential area in Neapean, Ontario, near Ottawa (ref. 44), reported a generation weight of 7 lbs/capita/year (3.19 kg/capita/year). The composition of the plastic waste

stream was given as: HDPE + PP, 75%; PET, 12%; and PS + PVC, 13%*.

A survey of the generation rate and composition of plastic film by residents in Peterborough, Ontario, is currently underway (pers. commun., Mr. J. Savage, ESSO Chemical). No data from this study are currently available.

1.2.2 Foreign Studies

1.2.2.1 United States

According to W. J. Rathje (ref. 33), the "disposable society" began in the mid-1800s. The earliest interest in discarded materials may be credited to an archaeologist who excavated the Andover, Massachusetts, town dump in the mid 1920s. In more recent times, knowledge about the kinds of "materials discards" that society generates have been of interest to two quite different groups of professionals: (1) those hoping to gain insight into archaeological interpretation of historical cultures by studying and analyzing modern material cultures; and (2) those hoping to develop the ways and means of reducing the volume of discarded materials through an understanding, in part, of the waste generation patterns of modern society. Oddly enough, while the objectives of these two groups, ie., archaeologists and professional engineers, respectively, are different, the methods employed by each group should have more in common with each other than may be presently acknowledged. Both archaeologists and engineers want to know the composition of the present day waste streams.

The job of conducting waste composition studies for governments has frequently fallen on the shoulders of companies with engineering expertise. These

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*HDPE - high density polyethylene
PP - polypropylene
PET - polyethylene terephthalate
PS - polystyrene
PVC - polyvinyl chloride

companies have been traditionally associated with solid and/or liquid waste management. However, as Rathje noted in 1979, "The behavioral aspect of the legal disposal of solid wastes involves determining the broad socio-economic correlates of household discard behaviour, including variation in solid wastes relative to household demographic composition and social strata, time of year, and general state of the economy. A number of civil engineers and solid waste managers have recently begun to conduct such studies" (ref. 33, pg. 26).

The Peter Middleton & Associates review (ref. 32) cited three residential refuse studies conducted in 1969 and 1970 that concluded that lower income groups throw out a higher percentage of food wastes and wealthier families discard a higher percentage of paper. Cognizant of potential socioeconomic differences in waste generation, a fourth study focused a sampling program on a middle income residential area.

Waste Composition Studies

The number of municipal waste composition studies conducted in the United States is very large. For instance, a list of the studies conducted by SCS Engineers, Long Beach, CA, reportedly fills three typed pages (pers. commun., R. Grier), and currently includes waste compositions investigations for the cities of New York and Los Angeles. The results of studies shown in Table 2 were obtained with relative ease from available literature and is by no means complete. Again, the waste classification categories and first column of data on the left side of the Table are from Table 9 in BH.

Techniques and Methods

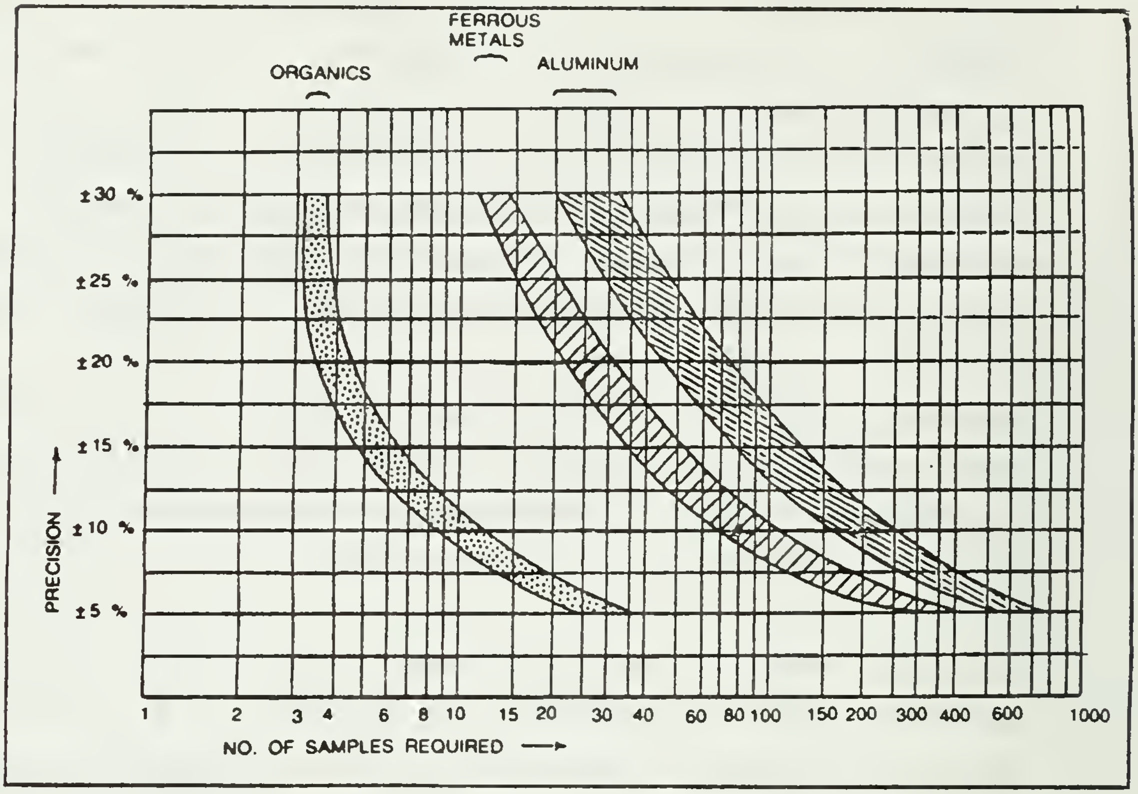
While the American Society for Testing and Materials is frequently cited as the "standard" for many analytical methods, the document in the series, whose title makes it appear appropriate for waste composition studies, i.e., ASTM F 889-82 (ref. 3), is of marginal use because it is expressly designed for use at

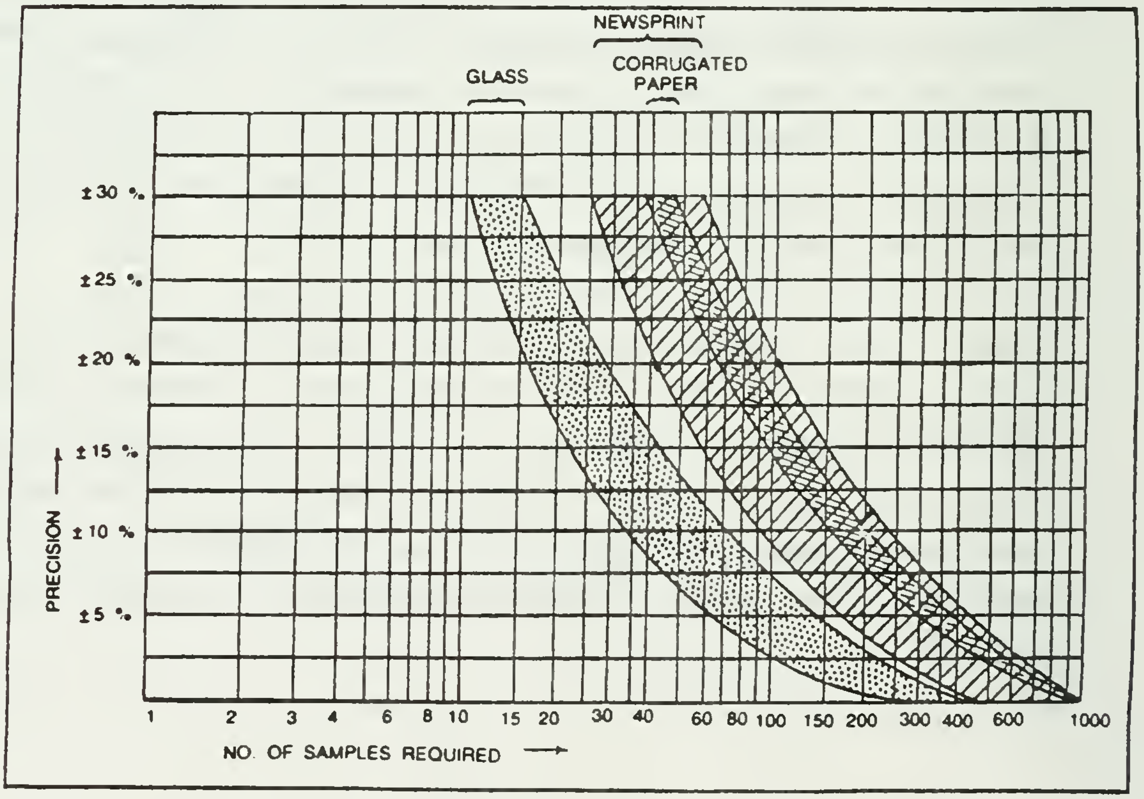
resource recovery facilities. The most notable individual who has significantly contributed to the "sample-and-sort" methodology is Dr. A. J Klee. Building on the statistical studies of Cochran (ref. 9), Klee & Carruth (ref. 25) reported a method, employing arcsine transformation of raw waste composition data, that enabled them to determine the minimum sample weight required to achieve appropriate levels of statistical confidence with respect to particular components in refuse. The results of their study showed that samples should weigh at least 200 lbs. (90 kg), but need not exceed 300 lbs. (135 kg) (ref. 24). Later, the method was adapted by Trinklein (ref. 45) in the design of a program for the sampling frequency of garbage trucks arriving at an energy-from-waste facility. The 200-300 lbs. (90-135 kg) sample weight range has been confirmed by other investigators (McCamic, ref. 28; also see Lohani & Ko, ref. 26).

How many samples in this weight range must be taken? If one has an approximate idea of the percentage that component 'X' is usually expected in refuse and can assign a precision range that one would like to achieve, with 90% probability, e.g., component 'X' is expected to be 25% of the refuse, with a desired precision (of the estimate) of 20% of the expected value: 25 ± 20%; then one can determine the number of 200-300 lbs. (90-135 kg) samples which must be taken and sorted. Tables and nomograms may be consulted to obtain the requisite number of samples (see refs. 20, 40, 47 & 48) or the sample number may be calculated according to the equation found in Klee & Carruth (ref. 25) and which is given herein , Section 4.7.2.

Figure 1 shows nomograms for residential waste composition studies.
Sample number is a function of two major factors: component abundance (%), standard deviations of sample data and desired confidence limits. The sample numbers required for satisfactory statistical precision become unmanageably large when dealing with components that are a small fraction of the total refuse or when the desired results are to have a high degree of accuracy and probability. (ref. 28).

FIGURE 1: NOMOGRAMS FOR RESIDENTIAL WASTE COMPOSITION STUDIES SHOWING THE RELATIONSHIP BETWEEN SAMPLE NUMBER AND STATISTICAL PRECISION (WITH 90% CONFIDENCE).





Composition sample requirements, residential sources only (with 90% confidence)

An important contribution to development of a methodology for sampling refuse generated in a wasteshed was made by Rathje and co-workers. Their earliest noteworthy study, "THE MILWAUKEE GARBAGE PROJECT" (ref. 34) clearly demonstrated the relationship between socio-economic stratification of populations and the qualitative and quantitative composition of residential refuse. The concepts embodied in the Rathje methodology are also noted in some engineering sampling protocols, e.g., SCS Engineers (ref. 40), and are contemplated by Woodyard & Klee (ref. 48).

In a literature and protocol review conducted for the State of Massachusetts (ref. 28), considerable emphasis was placed on implementation of a wasteshed sampling program based on socio-economic and demographic characteristics of the wasteshed. As previously noted, some studies have addressed the importance of demographic characterization of waste generation (ref. 34), but few studies have come to light that report results on a demographically sound basis. A very recent study, again by the Rathje group (refs. 35 & 36) was conducted for the City of Phoenix and revealed patterns of refuse disposal along ethnic lines as well as a function of collection time during the week, a point already well known to refuse collectors.

Waste Generation Rates

Waste generation rates may also be computed as part of a materials balance where material inputs must be balanced by outputs. This approach can be applied on a national scale but is not feasible on a small scale because of the difficulty in obtaining accurate input values (see ref. 8). In addition, there are no provisions for sociological "interventions" in this strict flow-sheet approach. The recent Franklin report on waste generation in the United States (ref. 18) is one example of this kind of a study.

The selection of per capita refuse generation rates shown in Table 3 includes rates for residential as well as municipal solid waste. For the United States in 1920, the generation rate was 2.8 lbs.(1.26 kg)/capita/day. A value of 4.03 lbs.(1.82 kg)/capita/day was reported for 1986-87 and excluded industrial wastes and "under-reported" wastes (ref. 1). Several Canadian values are also referenced in Table 3. In a recent "popular" article on solid waste (ref. 37), Rathje mentioned the range of daily per capita generation rates that he is aware of: 2.9(1.31), 3.02(1.36), 4.24(1.92), 4.28(1.93), 5.0(2.26) and...8.0(3.61) lbs.(kg). In his opinion, even a daily rate of 3.0 lbs. per capita may be too high for some parts of the country.

1.2.2.2 Non-North American

While the following sample of studies barely scratches the surface of the world literature, the references indicate the general applicability of the concept that waste generation can be correlated with socioeconomic patterns of human existence. Interesting data were reported by Sridhar et al. (ref. 41) for high, middle and low income families in Ibadan, Nigeria. The average putrescible content (kg/family) was positively correlated with high, medium and low income groups: 2.81, 1.52 and 0.37 kg/family, respectively. Coad (ref. 10) observed a large difference in the waste generation patterns of the wealthy and poor classes of society in Iran. A waste composition profile was recently reported for Minsk, USSR (ref. 6).

SECTION 2

METHOD DEVELOPMENT

2.0 METHOD DEVELOPMENT

2.1 Introduction: Rationale and Overview

It is reasonable to assume that both the quantity and the composition of residential waste generated in municipalities in Ontario has changed since the late 1970's when Bird & Hale conducted their landmark study (ref 5). Changes in packaging, technology, life styles and disposable income are some of the factors that can be expected to have altered the quantity and quality of residential refuse. The purpose of the present work was to develop a simple, cost effective and statistically meaningful method to be used by municipalities to determine the quantity and composition of residential waste, exclusive of leaves and other seasonal yard waste.

The method used in this study is based on the hypothesis that the characteristics of a residential waste stream are related to the socioeconomic lifestyles of people and the demographic characteristics of a municipality. Evidence from studies in the United States and elsewhere supports this hypothesis. The present method was developed by the team of Gore and Storrie Limited and Decima Research Limited.

The three municipalities participating in the method development study were selected in consultation with the Ministry of the Environment and fit into the three population categories that the Ministry required: small (population < 25,000), medium (population > 25,000 and < 100,000) and large (population > 100,000, belonging to Metropolitan Toronto). In deciding the three communities that would be approached to participate in the method development study, consideration was given to the following factors: (1) a municipality within Metro Toronto reflecting the earlier BH report; (2) municipalities outside of the sphere of Metropolitan Toronto; (3) geographic location in Ontario; (4) population and income distribution; and (5) housing type. Relevant information for the three study municipalities is given below, in order of increasing municipal population.

Town of Fergus

The Town of Fergus has a population of 6,757 (1988) and is located about 75 kilometres west of Toronto in Wellington County (Figure 2). Residential areas are generally composed of detached dwellings, occasionally interspersed with duplexes. There are also several neighbourhoods of apartments (3-4 floors; 35-60 units).

Residential refuse was collected weekly from detached dwellings by Plein Disposal; refuse from apartments was collected twice weekly by McLellan Disposal. A Class 1 residential Blue Box program, serviced detached dwellings (McLellan Disposal) but not apartments.

City of North Bay

The City of North Bay has a population of 51,313 (1989) and is located about 335 kilometres north of Toronto in the District of Nipissing (Figure 2). The residential areas are characterized by neighbourhoods of single detached dwellings; detached dwellings; duplexes and other attached dwellings; and neighbourhoods with small apartment buildings (3-4 floors; multiple units).

Residential refuse was collected weekly by Laidlaw Waste Systems Ltd. There was no Blue Box program or drop-off bins for recycling of materials in the City.

Borough of East York

The Borough of East York has a population of approximately 102,000 and is located in the Municipality of Metropolitan Toronto (Figure 2). The residential population is distributed in neighbourhoods of detached dwellings, frequently interspersed with small apartment complexes. There are also areas with numerous, large apartment buildings, each with several hundred units.

FIGURE 2: MAP OF ONTARIO SHOWING LOCATIONS OF THE THREE STUDY MUNICIPALITIES

Residential refuse was collected twice weekly by Borough employees from detached dwellings and apartments with fewer than 30 units. Large apartment buildings also had twice weekly collection service provided by various private contractors. A Class 1 Blue Box program serviced detached dwellings and small apartment buildings but not large apartment buildings. Blue Box collection was also a Borough function.

2.2 General Overview of the Method

2.2.1 Demographic Description of a Municipal Population

2.2.1.1 The Enumeration Area (EA)---General Description

Statistics Canada information about the population of a municipality may be provided for subunits of the population called Enumeration Areas (EAs). The information is derived during census gathering processes. An EA contains approximately 600 people but may frequently range over 800. The geographic area covered by an EA is determined by the type of housing; that is, a larger geographic area is occupied by a population that resides in detached, single dwellings than for a population of apartment dwellers.

Inasmuch as EAs are planned without specific regard for socioeconomic or other demographic factors, the likelihood that discrete socioeconomic sectors of a population are exclusively encompassed within an EA is greater in a large municipality than in a small one.

2.2.1.2 Classification of EAs According to Income

Using the most recent Statistics Canada Census data, each EA in the study community was stratified according to income level. The format for the stratification was:

High Income: average household income is at least 1/2 standard deviation greater than the mean income for the entire community;

Medium Income: average household income is no more than 1/2 standard deviation greater than, or less than the mean income for the entire community;

Low Income: average household income is at least 1/2 standard deviation less than the mean income for the entire community.

Figure 3 below illustrates the concept of population stratification by income, described above.

2.2.1.3 Classification of EAs According to Housing Type

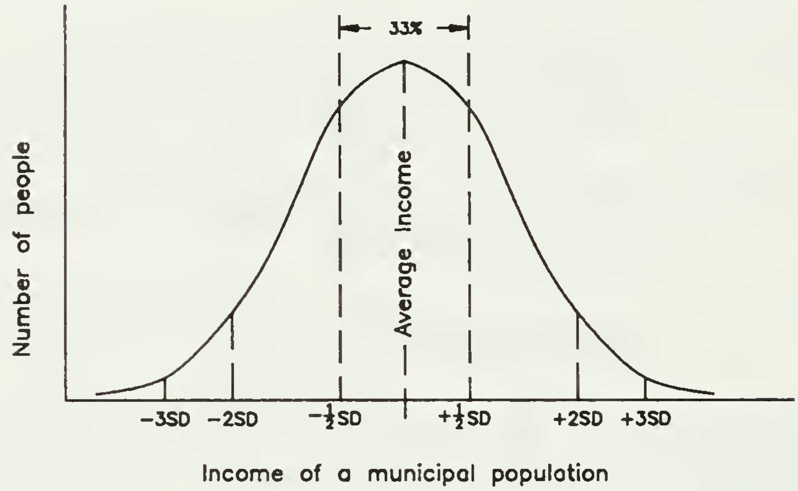
Within each income category, each EA was further classified according to housing type. For each EA, Statistics Canada reports the number of Single Detached residences, Apartments, and Other residences. These numbers, expressed as a percentage of occupied dwellings in the EA are used to identify the predominant housing type.

Primarily Single Detached: EAs with 60% to 70% of dwellings reported as single detached;

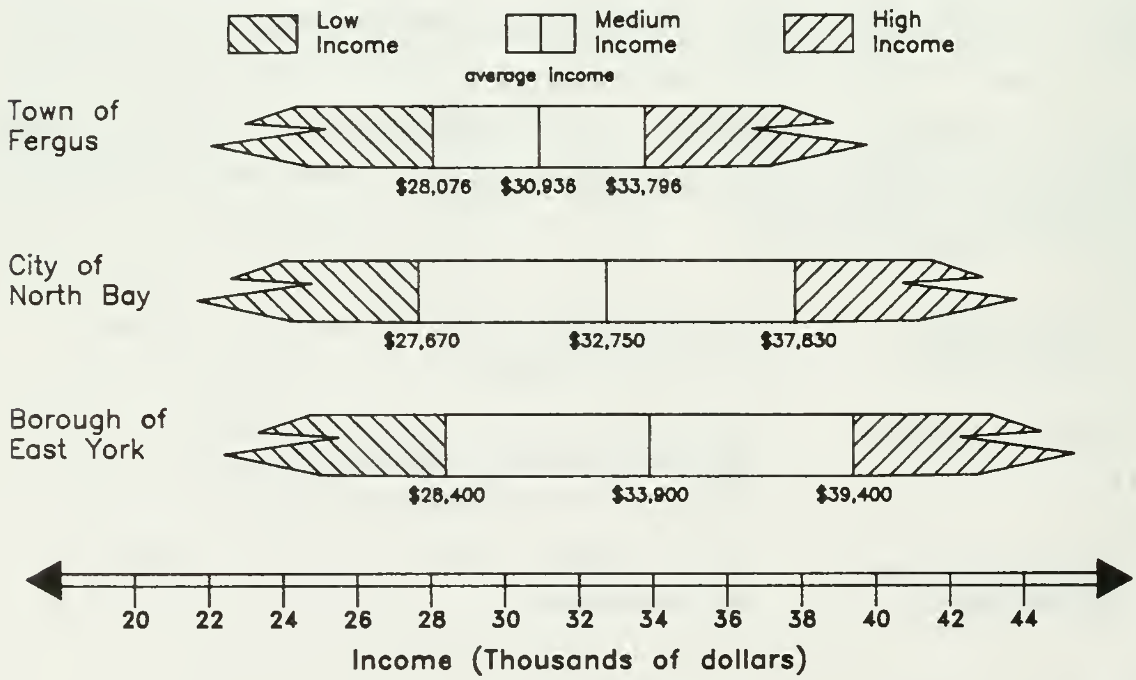
Mixed Dwellings: EAs with a mixture of single detached, apartment buildings with fewer than 30 units, and "other" dwelling types;

Primarily Multiple Dwellings: EAs with 60% to 70% of dwellings reported as "apartments".

FIGURE 3: CATEGORIZING A MUNICIPAL POPULATION WITH RESPECT TO INCOME:
- THEORETICAL DISTRIBUTION (3A)
- PRACTICAL APPLICATION (3B)



(3A) Idealized representation of normal income distribution over a municipal population. The middle income range extends between −1/2 SD and +1/2 SD and includes 33% of the population.



(3B) Comparison of the low, medium and high income categories for the three municipalities in the Study.

An exact boundary line between dwelling classifications was not rigorously specified in this Study because of the need for flexibility to consider the distribution of the minor components of the residential mix for a particular EA.

The distribution of types of residences across the whole municipality was examined to ensure that specific cells in the income housing matrix were not grossly out of proportion to the total number of EAs.

Table 4 below shows the housing/income matrix that was used in the present study for classification of the EAs in a municipality.

2.2.1.4 Income/Housing Matrix For the Town of Fergus

Using the most recent census data, the EAs for the Town of Fergus were classified according to the parameters of the income/housing matrix (Table 5). Of the 11 EAs reported by Statistics Canada for Fergus, 9 were placed within the study matrix. Two EAs were not included: a hospital zone and an area of Town that extended outside the Town limits.

Table 5 lists the 6 EAs that were actually sampled in the study. Their location within the Town of Fergus is shown on the map in Figure 4.

2.2.1.5 Income/Housing Matrix For the City of North Bay

Using the most recent census data, the EAs for the City of North Bay were classified according to the parameters of the income/housing matrix (Table 6). Of the 66 EAs reported by Statistics Canada for the City of North Bay, 57 were placed within the study matrix.

Typical of communities in Northern Ontario, the City limits of North Bay encompass a large rural area outside of the built-up central portion of the City. The income/housing matrix only includes those EAs in the urban area of the

TABLE 4: INCOME/HOUSING MATRIX USED FOR CLASSIFYING MUNICIPAL POPULATIONS.

		Dwelling Type	
	(1)	(2)	(3)
Income Level	Primarily single Detached Dwellings	Mixed Dwellings	Primarily multiple Dwellings
(A) High	A1	A2	A3
(B) Medium	B1	B2	B3
(C) Low	C1	C2	C3

TABLE 5: CLASSIFICATION OF THE EAs FOR THE TOWN OF FERGUS IN AN INCOME/HOUSING MATRIX. DISTRIBUTION OF EAs IN THE MATRIX (5A) AND EAs SAMPLED IN THE STUDY (5B)

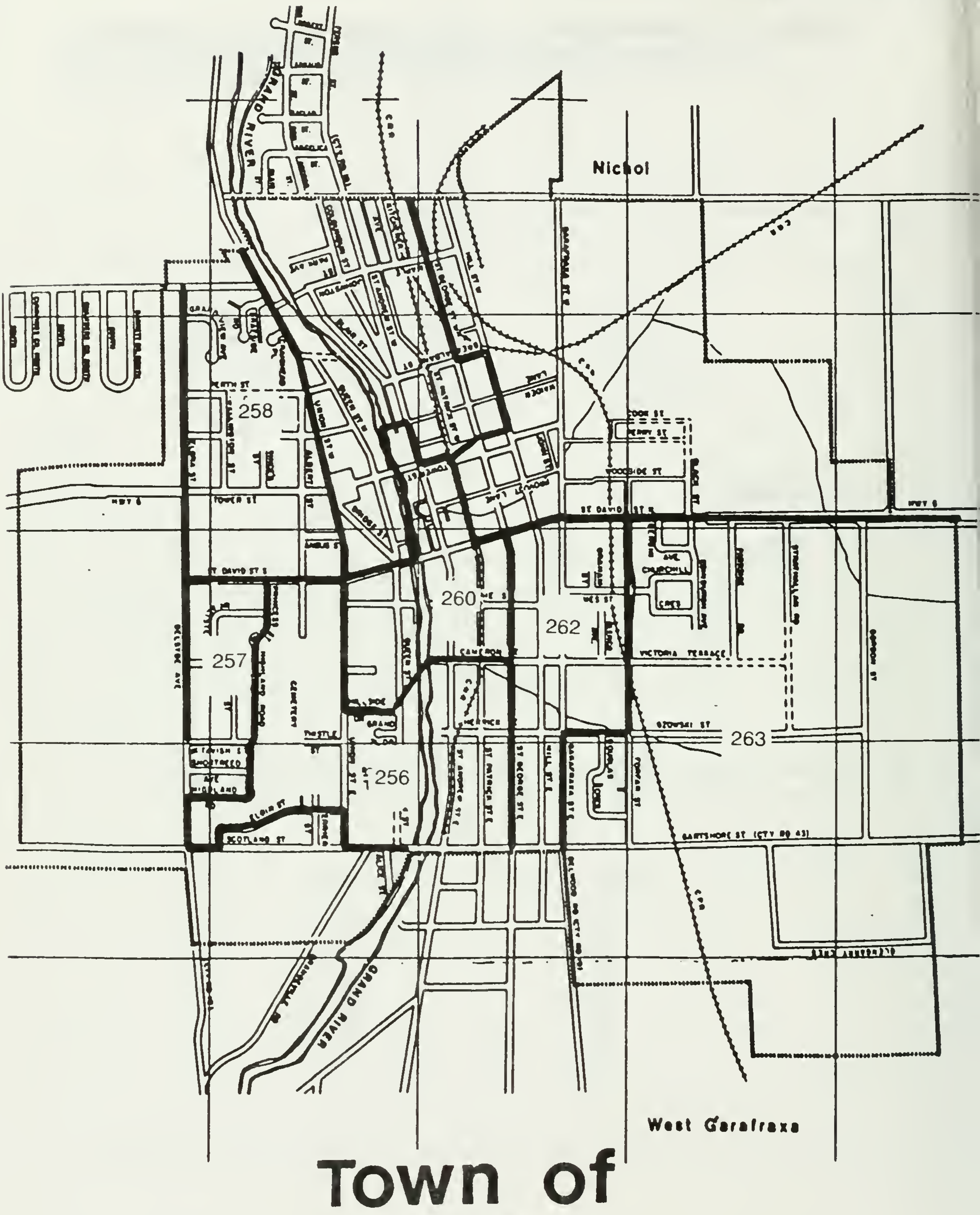
5A: Distribution of EAs in the income / housing matrix.

	(1) Primarily Single Detached	(2) Mixed Dwellings	(3) Primarily Multiple Dwellings
(A) High Income	1	0	0
(B) Medium Income	2	4	1
(C) Low Income	0	0	1

5B: Income / housing matrix cell number and corresponding EAs sampled in the study

Matrix cell	EA Number
A1	258
A2	---
A3	---
B1	262
B2	256,263
B3	257
C1	---
C2	---
C3	260

FIGURE 4: MAP OF THE TOWN OF FERGUS SHOWING TH
LOCATIONS OF THE 6 ENUMERATION AREAS



Town of
Fergus

TABLE 6: CLASSIFICATION OF THE EAs FOR THE CITY OF NORTH BAY IN AN INCOME/HOUSING MATRIX. DISTRIBUTION OF EAs IN THE MATRIX (6A) AND EAs SAMPLED IN THE STUDY (6B)

6A: Distribution of EAs in the income / housing matrix.[1]

	(1) Primarily Single Detached	(2) Mixed Dwellings	(3) Primarily Multiple Dwellings
(A) High Income	11 (19%)[2]	2 (4%)	0* (0%)
(B) Medium Income	10 (18%)	15 (26%)	0* (0%)
(C) Low Income	6 (10%)	12 (21%)	1* (2%)

[1] The income / housing matrix accounts for 57 of 66 EAs

[2] EAs in each matrix cell as a percentage (%) of the total 57 EAs

* The asterisks indicate cells that have populations that are too small to sample

6B: Income / housing matrix cell number and corresponding EAs sampled in the study

Matrix cell	EA Number
A1	114
A2	128
A3	---
B1	104*
B2	113*
B3	---
C1	065
C2	111
C3	---

* Cells B1 and B2 : field work is completed

City. 9 EAs were omitted from the matrix because they were either outside the urban area or they lacked necessary information for categorization. For example a hospital zone, parts of the Canadian Forces Base, an Indian Reservation and rural areas were omitted.

The location of the 2 urban EAs that were sampled in the Study are shown on the map of the City of North Bay (Figure 5).

(Note: The City of North Bay was studied after the Town of Fergus and the Borough of East York. Based on the results of the latter municipalities, it was decided to conduct a much reduced sampling program in the City of North Bay. At the same time, it was also decided to involve an employee of the City's engineering department in order to assess the feasibility of implementing the Study methodology by City staff, after a suitable training period. The City employee was very confident that he could continue the study without further assistance from Gore & Storrie Limited).

2.2.1.6 Income/Housing Matrix For the Borough of East York

Using the most recent Statistics Canada census data, the EAs for the Borough of East York were classified according to the parameters of the income/housing matrix (Table 7). Of the 179 EAs that were reported by Statistics Canada, 170 were placed within the study matrix. The remaining 9 were excluded due to insufficient information for categorization. Table 7 gives the 7 EAs that were included in the study and their locations are shown in Figure 6, a map of the Borough of East York.

FIGURE 5:

MAP OF NORTH BAY SHOWING THE LOCATIONS OF THE STUDY ENUMERATION AREAS

TABLE 7: CLASSIFICATION OF THE EAs FOR THE BOROUGH OF EAST YORK IN AN INCOME/HOUSING MATRIX. DISTRIBUTION OF EAs IN THE MATRIX (7A) AND EAs SAMPLED IN THE STUDY (7B)

7A: Distribution of EAs in the income / housing matrix.[1]

	(1) Primarily Single Detached	(2) Mixed Dwellings	(3) Primarily Multiple Dwellings
(A) High Income	13 (8%)[2]	17 (10%)	6 (4%)
(B) Medium Income	22 (13%)	34 (20%)	25 (15%)
(C) Low Income	0 (0%)	8 (5%)	45 (26%)

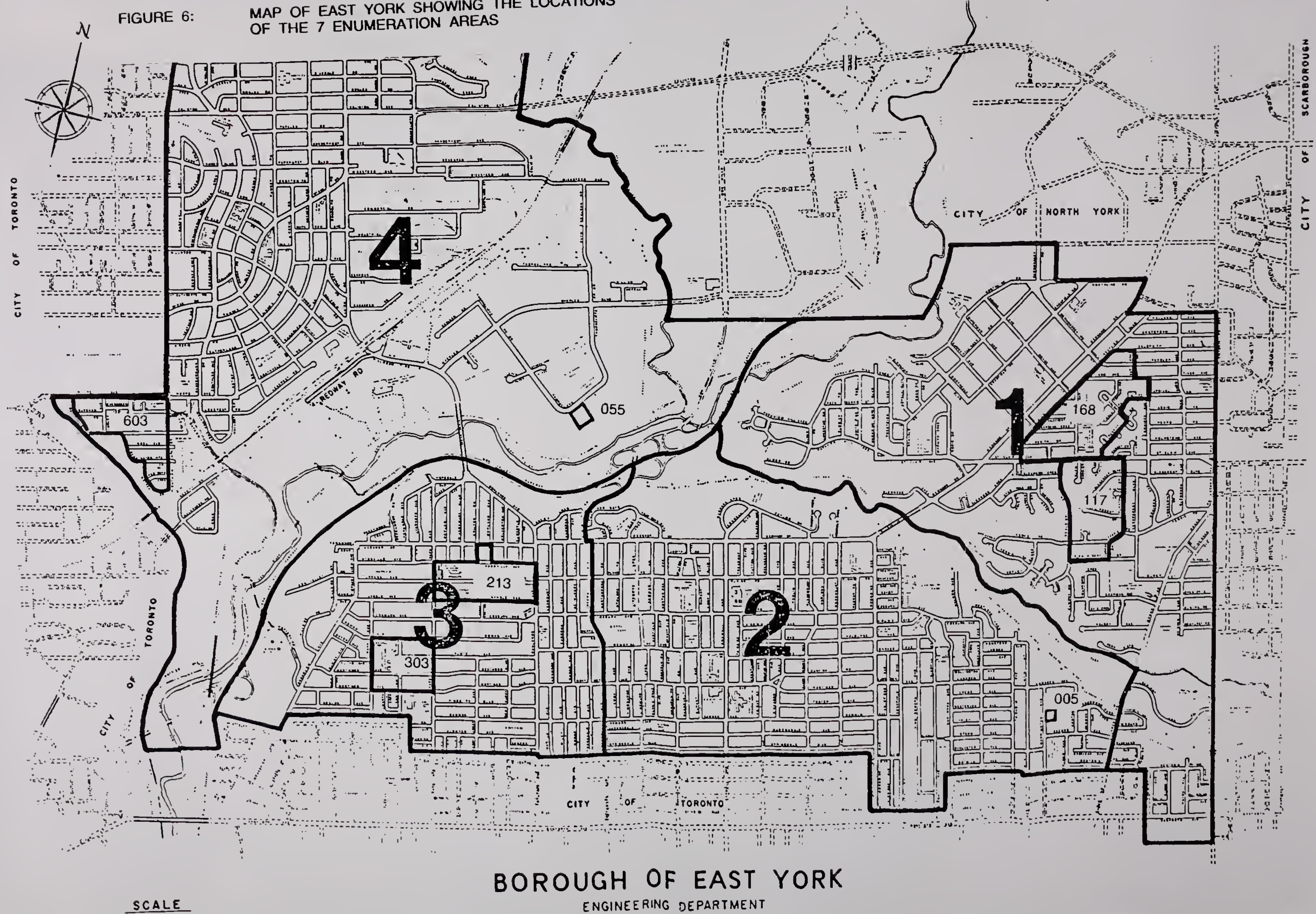
[1] The income / housing matrix accounts for 170 of 179 EAs

[2] EAs in each matrix cell as a percentage (%) of the total 170 EAs

7B: Income / housing matrix cell number and corresponding EAs sampled in the study

Matrix cell	EA Number	EA Name
A1	65-603	603
A2	90-117	117
A3		---
B1	90-168	168
B2	05-213	213
B3	12-054	055
C1		---
C2	05-303	303
C3	90-055	005

FIGURE 6: MAP OF EAST YORK SHOWING THE LOCATIONS OF THE 7 ENUMERATION AREAS



2.2.2 Residential Waste Sampling Plan Based on Municipal Population Demographics

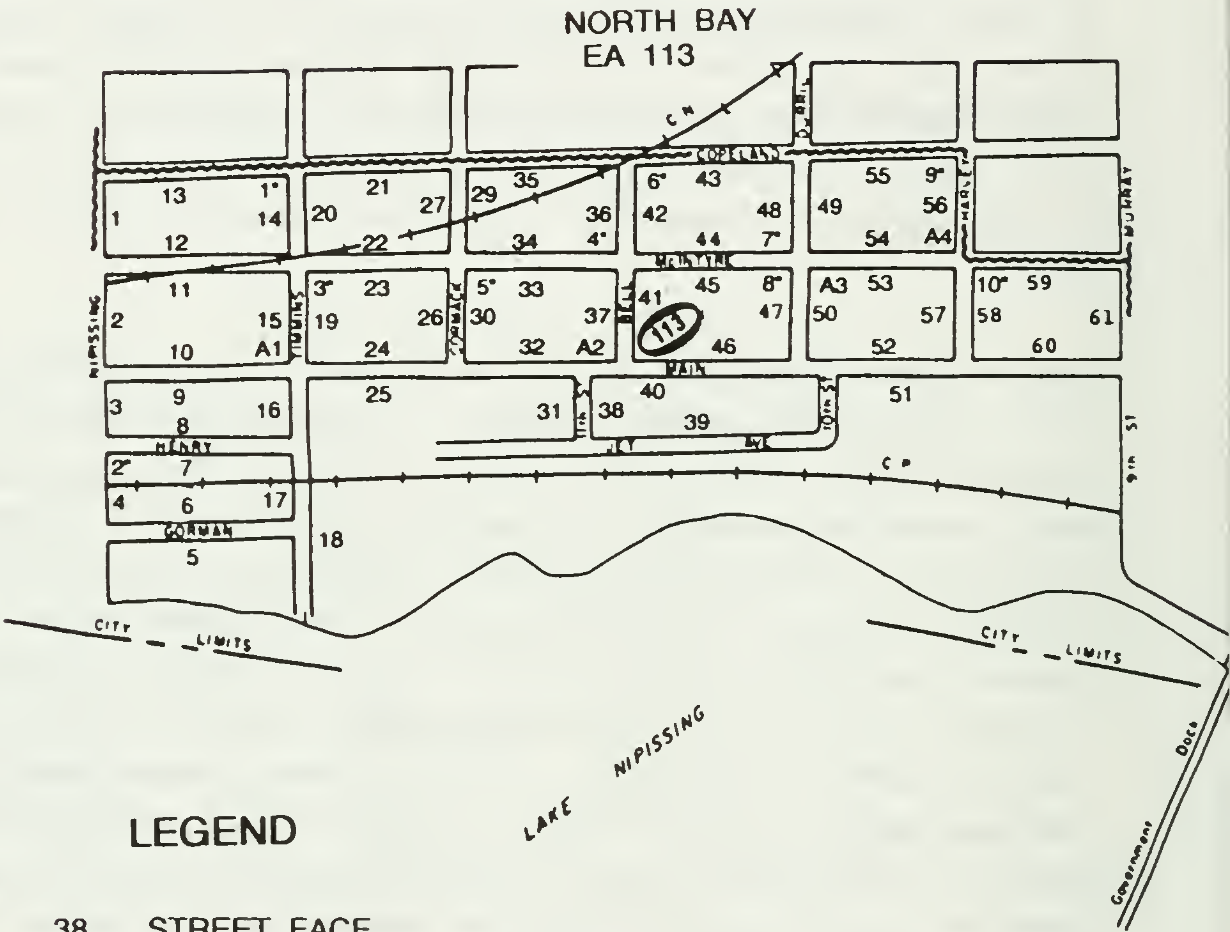
2.2.2.1 Street Numbering and Collection "Starting Points"

The following is a general description of the procedure for setting up a sampling program in each EA. Every street "face" within an EA was given a number. This process proceeded systematically, starting in the upper left corner of the EA map, numbering left to right as street faces were encountered, ending up in the bottom right corner of the EA map. Opposite sides of a street bear different numbers, with eight numbered street faces meeting at an intersection of two streets. The map in Figure 7 shows the numbering systems in a typical EA (for purposes of example, EA 113 from the city of North Bay is shown here).

Next, a random number table was employed to randomly select "starting points" for the curbside waste collection program. For example, if the number 17 was determined randomly, street face number 17 was located. Then, our convention was to select the intersection at the eastern or northern end of the street as a starting point. Certain practical limitations to this procedure were encountered from time to time but were easily overcome. For instance, if the random numbers selected from the table resulted in potential starting points that were too close to each other, i.e., their locations did not permit the collection of a minimum quantity of refuse before encountering another potential starting point, alternative starting points were chosen, as indicated below. In the field, starting points that were too close to each other were frequently "over-run" in order to collect the required weight of refuse at curbside (see also Section 2.2.2.2 below).

Nine starting points, indicated by an * on the map in Figure 7, and 3 or 4 alternate locations (indicated by an A1, A2, etc.) were usually supplied. No preference was implied between the first 9 and the latter 3 or 4 starting points, or the sequence in which the sampling occurred. However, there was a

FIGURE 7: EXAMPLE OF ONE EA SHOWING NUMBERING OF BLOCK FACES AND SAMPLE COLLECTION "STARTING POINTS"



LEGEND

38 STREET FACE

2* STARTING POINT

A3 ALTERNATE STARTING POINT

standardized, CLOCKWISE direction of collection from each starting point that enabled us to drive and collect waste on the right hand side of the street, proceeding clockwise around corners and into and out of cul-de-sacs. Alternative starting points were almost always used, for the reasons noted above.

The sampling of small and large apartment buildings, when they were either part of an EA or constituted an entire EA (by virtue of their size), respectively, will be described below in Section 2.2.3.5.

2.2.2.2 Problems Encountered

As the distribution of dwellings in an EA was not known by the study team from prior experience within any of the municipalities, several minor problems arose as a result of the random and "blind" determination of starting points in EAs. On the one hand, there was complete impartiality in assigning the starting points. On the other hand, some streets were sparsely populated, factories or commercial enterprises were present on others or waste from second floor apartments over commercial premises was co-disposed with commercial waste. The difficulties were readily overcome, on-site, by using the designated alternate starting points. If these latter points were exhausted, additional locations were randomly selected from the remaining potential starting points, i.e., street intersections, in the EA.

2.2.3 Data Acquisition: Collecting and Sorting Residential Refuse

2.2.3.1 Collection Equipment

The following list of equipment includes rented vehicles and purchased equipment:

one - 4.3 m.(14 ft.) cube van (for collection of bagged refuse);
one - pick-up truck (for collection of Blue Box contents);

one - electronic platform scale (150 kg capacity, Accu Weigh Model PAK-150 (electronic, battery operated scale with digital read-out), Exact Weight Scale, Inc., Toronto, Ontario);

six - 1.2 m.(4 ft.) x 1.2 m.(4 ft.) x 1.2 m. (4 ft.) heavy duty corrugated containers ("gaylords"); these containers were used for storing the bagged (non-Blue Box) refuse samples as they were being collected;

four - 1.2 m.(4 ft.) x 1.2 m.(4 ft.) divider frames (2.5 cm. x 5.1 cm. wood furring stock/chicken wire); these were used as horizontal partitions in the back of the cube van for separating the collections of bagged (non-Blue Box) refuse which were stacked on top of each other;

two - 46 cm.(18 in.) x 2.4 m.(8 ft.) divider frames (2.5 cm. x 5.1 cm. wood furring stock/chicken wire); these were used as the two main partitions in the back of the pick-up truck for segregating the collections of Blue Box materials (see Figure 8);

nine - 46 cm.(18 in.) x 41 cm.(16 in.) (approx.) plywood panels; used as partitions in the back of the pick-up truck (see Figure 8);

one - chicken wire "crib": 1.2 m.(4 ft.) x 1.2 m.(4 ft.) x 1.3 cm.(1 2 in.) plywood base; 0.6 m.(2 ft.) high chicken wire and 2.5 cm. (1 in.) x 5.1 cm.(2 in.) furring sides. Nailed to the underside of the crib floor was a square frame which permitted the crib to be centred on the bed of the platform scale (see Figure 9); the crib was used for weighing the refuse as it was being collected from curb-side;

150 - 50.8 cm.(20 in.) x 76.2 cm.(30 in.) x 6 mil polyethylene bags (Oxford Packaging Inc., Mississauga, Ontario); these were used for bagging refuse that was set out loose in garbage cans; the bags were also used for storing refuse samples for moisture and chemical analysis;

40 - 30 litre polyethylene garbage cans; these were used as containers into which sorted refuse was placed (see Figure 10);

one - 2.7 m.(9 ft.) x 3.7 m.(12 ft.) reinforced plastic tarpaulin for covering Blue Box materials in the pick-up truck;

six - elastic straps to secure the tarpaulin in place;

one - broad-mouth aluminum shovel; used for cleaning up spills;

FIGURE 8: PHOTOGRAPH OF PICKUP TRUCK WITH COMPARTMENTS FOR BLUE BOX MATERIALS.

FIGURE 9: PHOTOGRAPH OF CHICKEN WIRE CRIB MOUNTED ON THE PLATFORM SCALE (REAR VIEW OF CUBE VAN)

one - broom; used for cleaning up spills and sweeping out the vehicles;

one - staple gun and 0.95 cm.(3/8 in.) staples for construction and repair of chicken wire dividers and crib;

one - claw hammer; 5.1 cm.(2 in.) common nails: used in the construction of the crib and divider frames.

Special Requirements In Each Municipality For Sample Sorting

a) Town of Fergus

The field study took place between: July 15 and August 31, 1989.
Written approval was received from the City of Guelph that enabled the Study to use the landfill site as its base of operation, with space for sorting the refuse samples, an eating area, washroom facilities and helpful guidance from the municipal staff.

The refuse was sorted, weighed and disposed of at the landfill site. The sorting of bagged refuse took place on the tailgate of the pick-up truck (see Figures 10 & 11), following the sorting and weighing of the Blue Box materials stored in the truck. Several sheets of plywood, resting on the tailgate, extended the working surface to comfortably accommodate four people, surrounded by the garbage cans.

b) City of North Bay

The field study took place between: February 21 - 28 , 1990.
The assistance of one employee of the City Engineering Department was provided to complete the Study team (as noted above). Written approval was received from the City of North Bay that permitted the Study team to use the Work's Yard as their base of operations. Available at that location were: an eating area, washrooms and a telephone.

A large 7.6 m.(25 ft.) x 7.6 m.(25 ft.) carnival tent (see Figure 12) was used as a sorting area at the City's Work's Yard. The tent, supplied by the City of North Bay, provided storage space for the samples and protection for the Study crew from the winter weather. Two, 15,000 BTU propane heaters (see Figure 13) were used to heat the tent. Refuse was sorted inside the tent on a plywood table, mounted on saw horses.

Several combinations of protective clothing were experimented with by the Study crew. In addition to heavy duty rubber gloves and safety glasses, cotton coveralls, a large rubber apron and a hat seemed to provide adequate protection. On very cold days, a nylon parka or shell was worn.

Sorted and weighed samples were disposed of in a 18.3 m.(20 yd.) roll-off bin, rented from a private hauler. When full, the bin was taken to the landfill site for disposal of the waste and an empty bin was left in its place.

c) Borough of East York

The field study took place between: October 24 and December 28 , 1989. Written approval was received from the Municipality of Metropolitan Toronto that enabled the Study to use the Commissioners Street incinerator as its base of operation, with space on the tipping floor for sorting refuse, a heated office and washroom facilities and helpful guidance from municipal staff at both the incinerator and the Bermondsey Transfer Station.

The refuse was sorted, weighed and placed in a 18.3 m.(20 yd) roll-off container, rented by Gore & Storrie Limited for the duration of the study. The sorting of refuse was conducted off the tailgate of the pick-up truck, as described for the Town of Fergus. Arrangements were made with a private hauler to have the container taken to the Bermondsey Transfer Station for disposal when the container was full; an empty container was left in exchange.

FIGURE 10: PHOTOGRAPH SHOWING THE POSITIONING OF THE STUDY TEAM AROUND THE TAILGATE SORTING TABLE

FIGURE 11: PHOTOGRAPH SHOWING THE PLYWOOD TABLE SITTING ON THE PICKUP TRUCK TAILGATE.

FIGURE 12: PHOTOGRAPH SHOWING THE CARNIVAL TENT IN WHICH REFUSE SORTING WAS CONDUCTED.

FIGURE 13: PHOTOGRAPH SHOWING THE PROPANE HEATERS, REFUSE SAMPLES UNDER BLUE TARPAULINS AND ONE CORNER OF THE PLYWOOD SORTING TABLE (LOWER LEFT CORNER OF PHOTOGRAPH) MOUNTED ON SAW HORSES INSIDE THE CARNIVAL TENT.

2.2.3.2 The Field Crew

Four or five people were needed for the waste collection task where a Class 1 Blue Box program was in place (Town of Fergus; Borough of East York): two truck drivers, one collection data recorder and one (or two) people to pick up the bagged refuse and Blue Box materials. Occasionally, a 5 day work-week was not long enough to complete the collection and sorting operations and an additional work day (Saturday) was required.

In North Bay, where there was no Blue Box program in place, a three member crew carried out the refuse collection. It should be noted that the reduced crew number required that they work an extra full day, i.e., Saturdays, to complete the sorting and weighing of waste.

Personal equipment included:

- heavy duty, waterproof (PVC-coated) gloves;
- work clothes or coveralls; apron; hat
- steel toed work boots;
- eye protection;
- tetanus/polio vaccination (optional: diphtheria, Hepatitis A and Hepatitis B);
- traffic safety vest;
- particle masks, worn by crew members concerned with dust and the possibility of disease transmission;
- anti-bacterial soap, used to clean gloves, hands and face before meal breaks and at the end of the day.

2.2.3.3 Documents and Meetings

Two important documents were obtained from the Ministry of the Environment, Waste Management Branch. The first authorized the collection of waste for the Ontario Waste Composition Study; the second was a letter to be given to any individual in the municipality who was interested in learning more about the ongoing residential Study.

Following Ministry of the Environment approval to consider a municipality for inclusion in the Study, a meeting was arranged with the municipality to discuss the aims of the Study and "invite" the municipality to participate. Following the meeting, a formal letter of request was sent to the municipality.

A high level of coordination, to ensure scheduling of refuse collections, required weekly meetings and numerous phone calls between the Study Project Manager, municipal staff and waste haulers. Each week, a map of the EA scheduled for inclusion in the refuse study was delivered to municipal staff and/or the waste haulers. There was only one incident during the entire Study when the "line of communication" failed, but only briefly.

A similar level of coordination was required in order to obtain permission to include small and large apartment buildings in the Study. Usually the details were arranged through phone conversations with apartment owners and building managers and waste haulers, but occasionally written requests for permission were prepared.

In North Bay, a press release was issued by the City to inform its residents about the City's participation in the Ontario Waste Composition Study.

2.2.3.4 Waste Collection Process: Detached Dwellings---General Procedures

The goal of the waste collection process, on any one day, was to obtain 10 (9 as a minimum), 100 kg (minimum weight) samples of residential waste---exclusive of the weight of Blue Box materials and yard waste that were also coincidentally collected if they were placed curbside. This task proceeded as quickly as possible, with a 0700 h start, so that the normal collection of waste and Blue Box items by the municipality was not seriously inconvenienced.

The waste sample collection began at one of the starting points (refer to Figure 9). Waste was collected in front of every dwelling where it was set out, until approximately 100 kg were accumulated in the crib (Figure 12), some variations to this are noted below. An "en route" collection record was kept of the number of dwellings that had waste set out: general waste and/or Blue Boxes. Single and duplex dwellings were also indicated.

The importance of the "en route" collection record and the accuracy of the recording of the number of dwellings that were sampled should be noted. The team member who recorded the trip data did not have time to concentrate on any other aspect of the curb-side collection process.

Loose waste set out in garbage cans was rebagged in clear polyethylene bags. These bags were reused and not included in the analyzed waste sample. The collected waste was placed in the chicken wire crib which was mounted on the platform scale on the floor of the van (see Figure 9). The scale was tared with the empty crib on it, prior to filling the crib with waste. When the minimum required weight of waste had been collected (with an allowance for the estimated inclusions of yard waste co-disposed with household waste), the crib was unloaded and sample was stored in the van.

Corrugated gaylords were used to store six of the waste collections. Two of the remaining collections were piled on top of 1.2 m.(4 ft.) x 1.2 m.(4 ft.) chicken wire dividers placed on top of the collections in the gaylords. The ninth collection of bagged refuse was piled on top of the Blue Box materials, stored in compartments in the pick-up truck (see below), while the tenth collection was kept in the weighing crib.

Yard waste set out at the curb was weighed at the time of sample collection. The weight was recorded and the yard waste was placed back at the curb for municipal waste collection. (Note: the Town of Fergus issued a notice that yard

waste should not be set out for collection but this edict appeared to be widely ignored).

Blue Box items were placed in the corresponding sample compartment in the back of the pick-up truck (Figure 8). There was space for 9 collections in the truck; the tenth collection was stored in polyethylene garbage cans in the van.

It took between 2 and 2.5 hours to make 9-10 collections within an EA. Following the last collection, the contents in the pick-up truck were covered with a tarpaulin. Elastic straps secured the crib and contents in the back of the van. The Study team proceeded to the base of operations in the municipality and began sorting the samples.

Special Requirements In Each Municipality For Sample Collection

a) Town of Fergus

Municipal solid waste was collected on Wednesday or Friday, depending on whether the street address was on the North or South side, respectively, of the Grand River. In several cases, EAs were intersected by the River and the sampling programs required waste collections on both days.

b) City of North Bay

Municipal solid waste was collected on Tuesday or Wednesday, depending on the street location in the City. The short time interval between the City's agreement to participate in the Study and the timing of the first curb-side collection precluded a careful coordination of the Study's collection route and the normal collection routes of the City's refuse contractor. Thus the Study crew had to commence sample collection at 0500 h and finish by 0700 h, in order to avoid having the waste picked up by the regular collection service.

c) <u>Borough of East York</u>

The Borough of East York had a twice weekly curb-side collection program: Monday and Thursday or Tuesday and Friday, depending on whether a street was West or East, respectively, of Greenwood Avenue. Therefore, two trips were made to collect waste from the same sample areas, i.e., using the same starting points, in each EA.

Staff in the Borough of East York indicated that about 60% of the weekly volume of refuse was placed at curb-side for the first of the two weekly collections, with about 40% set out for the second collection. This ratio was not universally reliable for all of the EAs in the Borough. With a target of 100 kg (minimum weight) of waste that had to be collected for a sample of adequate size, the following collection protocol was developed and illustrated in the example below.

For a given sample, approximately 60 kg of bagged refuse was collected from approximately 7 houses, on the first collection day. The collection on the second day was initiated at the same "starting point" in the EA and waste was collected from <u>the same number of dwellings</u>. This ensured that an accurate per capita generation rate could be estimated. In theory, the 60/40 relationship would also result in approximately 40 kg of refuse collected on the second occasion, for total of 100 kg of waste for the composition analysis.

The uncertainty of the 60/40, or any other ratio, required that we "overcompensate" with respect to the weight of the first collection in each sample by picking up more than 60 kg (e.g., 70 kg) from approximately 9 dwellings. This "insurance" weight meant that the crew <u>was required</u> to pick up from 9 dwellings on the second collection day. The total sample weight, that is, the sum of two collections, would therefore not likely be less than 100 kg. Of course, the fear was that the weight of refuse collected from the nine

dwellings on the second day would put the total considerably over the 100 kg point and require additional hours of sorting.

Waste collection from apartment buildings did not present this kind of a sampling problem (see below).

2.2.3.5 Waste Collection Process: Apartment Buildings

Special Requirements In Each Municipality

a) Town of Fergus

100 kg waste samples were removed from the waste bins at each apartment building for the composition analysis. In some cases, 2 - 100 kg samples were taken. The residual waste that remained after the sample(s) was taken, was removed, weighed and returned to the bin for normal pick-up.

The normal waste collection schedule for apartments was on Monday and Friday. Our collections were made on Fridays, only, and per capita generation rate calculations accounted for the 5 day period of waste accumulation. The number of units in each apartment was determined as well as the occupancy rate.

(Note: the weakness of this procedure, i.e., the omission of collection of refuse generated over the weekend, was rectified later in the Study in the other municipalities. It is possible that the estimated per capita generation rates for this sector of the Fergus population is lower than it might have been, had the calculations included the 3 day part of the week, i.e., the weekend, when people are frequently at home and the refuse generation may be expected to be higher than during the Monday to Friday period.)

b) City of North Bay

In North Bay, waste was sampled from small apartment buildings (fewer than 30 units) only. This waste was placed curb-side at the buildings that were part of the collection route, therefore no particular problems were encountered. The quantity of waste placed at the curb was sufficient to comprise a single sample per building (125.6 kg and 105.3 kg). The number of units occupied in each building was determined later and recorded.

c) Borough of East York

Small Apartment Buildings

The waste from apartment buildings with up to 30 units was collected by the municipality as part of the curb-side residential collection program. Frequently such premises were part of the sampling areas in the Study EAs. The following procedure was applied. On the first collection day, approximately 60 kg was randomly taken from the curb-side pile of bagged waste, weighed and placed in a gaylord. The remaining portion of waste was weighed and replaced at the curb for collection by the Borough's garbage brigade. A similar procedure was followed on the second collection day, except that about 40 kg of waste was randomly collected, with the remainder being weighed and returned to the curb.

A general problem with the small and large apartment buildings was that despite the knowledge of the number of units that were actually occupied, we could not be certain that ALL tenants put out their waste for the collections that we sampled. In our calculation of the per capita waste generation rate we have multiplied the number of units by the Statistics Canada data for average population per dwelling to obtain the estimated number of residents in the apartments. The weight of waste set at the curb (or accumulated in the refuse bins) was divided by the apartment population. Our calculations could

underestimate the per capita generation rate if some of the residents did not discard their refuse in a pattern which was coincident with the normal refuse collection pattern. Unless tenants received specific instructions from apartment managers, tenants could be "isolated" from the regularity of garbage collection:...down the garbage shoot...out of sight, out of mind...at least it is not smelling up my unit.

When Blue Box materials, especially grocery bags of newspapers, were placed at the curb in a manner which obviously intended that they would be collected by the Borough's recycling truck, the team placed the materials in the appropriate section of the pick-up truck. Again, as noted above, we did not know how many of the apartment units (number of tenants) contributed to the separate pile of Blue Box materials.

Large Apartment Buildings

Two large apartment buildings were EAs unto themselves: EA 12-055 and EA 90-055. They were treated as individual EAs in that nine, 100 kg samples were collected from each of the two buildings. The following discussion describes the procedures employed at EA 90-055, which serves as the example.

Under normal circumstances, waste collection, by a private hauler, was made twice a week (in both of the EAs). Thus, the Study team applied the "60 40" sampling plan described earlier for the Borough of East York (Section 2.2.3.4). Six bins of waste were set out on each collection day. On day 1, approximately 60 kg of waste were randomly taken from the top of each bin; these collections were the first 6 samples. For the last 3 samples, the bins were paired and resampled so that each sample contained waste from 2 bins.

Prior arrangements were made with the apartment's hauling company to provide an empty front end/overhead packer truck to pick the waste remaining in the 6 bins and deliver it directly to the Bermondsey Transfer Station for weighing

and disposal. The weight of the waste was telephoned to the hauler's office from the Transfer Station and the datum was relayed to Gore and Storrie Limited.

A similar sequence of operations was followed on the second collection day, except that the sample weights of waste removed from the bins were approximately 40 kg. The sum of the 18 sample weights and 2 residual weights gave the total weight of refuse generated by the "towering" EA during the week.

2.2.3.6 Special Collections

Yard Waste

Yard waste set out at the curb was weighed and replaced at the curb for the regularly scheduled municipal refuse collection. The weight of yard waste recorded "en route" for each sample was later combined with the yard waste that was co-disposed with household refuse to give a total weight of yard waste for the sample.

While the weight of yard waste is recorded, herein, on the raw data sheets for the waste composition (see Appendices A2, B2 & C2), it may be **NOTED THAT** the calculations of per capita generation rates and waste composition percentages in the present Study do not include the yard waste component. An explanation for this decision in data handling may be found in the Literature Review (see Section 1.2.1).

Leaves

A figure for the reported tonnage of leaves collected from the Borough of East York during the fall, 1989, was obtained from staff at the Commissioners Street Incinerator and confirmed by staff in the Borough Work's Department. The reported weight was 1,115.2 tonnes.

Schools

Special arrangements were made with the Borough of East York Work's Department that enabled the Study team to collect waste from 7 schools: 4 primary, 2 junior high schools and 1 high school. The curb-side sample collection method was the same as that used for small apartment buildings described above in Section 2.2.3.5 (Borough of East York---small apartment buildings).

Christmas

Residential refuse was collected from EA 90-117 (middle income / primarily detached dwellings) on 28 December 1989. Blue Boxes were not set out at the time of this Christmas week collection. The EA had been initially sampled on 28 and 30 November, 1989.

2.2.3.7 Equipment For Waste Sorting

The following equipment and supplies were needed for the waste sorting and composition analysis:

- 1-150 kg capacity platform scale (noted previously);
- 1-5 kg capacity scale (Accurate model 5000 (electronic, battery operated with digital read-out), Exact Weight Scale Inc., Toronto, Ontario);
- 40-polyethylene garbage cans (note above);
- 1-claw hammer;
- 1-slotted screw driver;
- 1-electrician's pliers;
- 4-magnets
- pairing knives for opening plastic bags
- Personal equipment was listed above in Section 2.2.3.2.

2.2.3.8 Personnel

<u>Town of Fergus</u>

Four students from Sheridan College in Mississauga, Ontario, and a graduate of the University of Toronto were the Study crew on this phase of the work. They possessed a background in science or engineering and had a working knowledge of measuring techniques, the care of reasonably delicate equipment and data recording. At the outset of the work they were given instruction, by Dr. Fred Edgcombe, Executive Director, Environment and Plastics Institute of Canada (EPIC) in the kinds of plastics that would likely be encountered during the survey of residential waste.

It was emphasized that the Study was really a "laboratory situation". Thus attention was given to organization, routine, reproducibility, consistency---even the cleanliness of garbage cans, van floor etc. This approach attempted to maximize a scientific attitude and thoughtful responsibility leading to careful work habits that the students learn as part of their analytical training.

<u>Borough of East York</u>

Three members of the Study team departed prior to the time the Borough of East York Study got underway, however one Study team member remained to give important continuity for the work. The three new Study team members were university graduates in science and liberal arts, with practical waste composition experience or with the objectives of the Study serving as a "cause célèbre" for their participation.

<u>City of North Bay</u>

The three Study team members included two of the Borough of East York team and one staff member of the City of North Bay Engineering Department. The

latter individual was a University graduate with a science background and, at the time, was training to be a Recycling Co-ordinator.

General Attitudes

It took about 2 weeks of sorting waste before the Fergus Study team had "risen above" the physical (distasteful) aspects of the work and saw the larger picture, i.e., the residential waste characteristics of the citizens of Fergus.

In the other two municipalities, the Study team reached a level of proficiency earlier than the Fergus team. It should be noted however, that the working conditions in Guelph, e.g., high temperatures, direct sun, blowing dust, flies, a general maggoty condition of the refuse and very strong odours produced in the heat, were much more "trying" conditions than those experienced by either of the other Study teams.

2.2.3.9 Sorting Routine

Blue Box Materials

Each compartment of the pick-up truck was sequentially unloaded and the Blue Box materials were sorted into the categories noted at the bottom of the data sheets found in Appendices A2, B2 & C2. The separate categories of materials were placed into 114 lit.(30 gal.) polyethylene garbage cans, which had uniform tare weights of 1.8 kg., and the weight of each material was determined. The weights of the Blue Box materials were entered on the appropriate waste sample data sheet. The sample data sheets were identical to those shown in Appendices A2, B2 & C2.

The materials collected in the Blue Box program in the Borough of East York included rigid plastic containers and OCC (Old Corrugated Containers), items that were not part of the recycling program in the Town of Fergus.

The City of North Bay did not have a Blue Box program.

Blue Box materials were separated into the following categories*:

a) Newsprint, including coated paper inserts
b) Liquor/wine bottles
c) Food jars/other bottles
d) Food cans (i) ferrous
(ii) non-ferrous
e) Beer cans (i) ferrous
(ii) non-ferrous
(iii) American
f) Pop cans (i) ferrous
(ii) non-ferrous
g) PET bottles
h) Rigid plastic containers
i) OCC

----

*items a-g in the Town of Fergus; items a-i in the Borough of East York

<u>"Bagged" Residential Refuse</u>

The contents of the remainder of the residential waste stream, i.e., the largely bagged refuse, were sorted according to the categories of items listed on the data sheets found in Appendix A2, B2 & C2. Blank data sheets were used to record the weights of the categories of waste. The samples were sorted one at a time by the sorting team.

Each 100+ kg sample was unloaded from the cube van and sorted. The 9-10 samples collected in an EA were sorted over a 3-5 day period. A sorting routine was developed as follows. Garbage cans into which the various components of the waste were sorted, were arranged in an array around each sorter (see Figure 10)---with the following notation of "handedness", in respect to containers for plastics and paper, to permit the sharing of containers between sorters. Directly in front of each sorter (or nearly under the sorting table) were his/her own receptacle for food waste, with containers for polyolefins

(polyethylene & polypropylene) and assorted paper tissue on either side of the central food container. Then, progressing backward on the left (or right) hand side was a grouping of containers for other kinds of plastics. On the opposite side, were containers for other categories of paper items. Hence, the "handedness" aspect of container placement permitted the person on the left to sort plastics with the right hand while the person to the right sorted plastics with the left hand. Containers for metals, glass, diapers---categories of materials that could be lobbed some distance to shared containers---were located behind the sorters.

The "handedness routine" was devised to minimize the handling of the same material twice, i.e., transferring an item between hands, and to speed up the sorting efficiency.

Items that were not easily classified, that is, they were composed of several materials that could not be readily separated from each other e.g., light bulbs, costume jewellery, electrical equipment, etc., were weighed separately (or simply counted, as in the case of light bulbs) and recorded on a sheet of "miscellaneous items" for each sample (see Appendices A2, B2 & C2).

Note: The weights of all of the components were summed and the percentage of each component was determined on the basis of this sum and not the weight of the sample determined en route, during curbside collection. As noted above, 3-5 days were required to sort the residential refuse collected from an EA. During this time, the samples lost some weight, presumably via evaporation of water. Under the summer conditions during the Study in the Town of Fergus, moisture loss occurred during the sorting process, as bags of refuse were opened and air exchange promoted evaporation of water, particularly under sunny or windy conditions.

Under the winter conditions during the latter part of the Study in the Borough of East York and for the entirety of the work in the City of North Bay, the

garbage was frozen. This created a problem for separating frozen items, particularly food which was frozen to packaging. There was also less evaporation of moisture when the separated items were exposed to the open air.

Table 8 is a copy of the field data sheet used in the study showing the categories into which the household refuse was separated.

Notes On the Categories

Dr. Fred Edgecombe, Executive Director, EPIC (Environment & Plastics Institute of Canada) recommended that we group all polyethylene and polypropylene containers and film plastics together as "polyolefins" (item 5a), rather than trying to distinguish between polyethylene of different densities and crystal linearity. A small amount of SARAN wrap (polyvinylidene chloride) would also have been included in this category.

The PVC category (item 5b) was restricted to rigid containers; the vinyl category was reserved for other materials such as scraps of vinyl siding.

A simple "smoke and drip" test, provided by Dr. Edgecombe, was used to assist in determining the category for a particular plastic item. The test is included as Appendix D but it should not be viewed as a definitive qualitative method when used by itself.

Mixed blended plastics (item 5f) were reserved for plastic packaging around meat products. Coated plastics (item 5g) were for packaging in which the plastic portion was judged to be the greatest percentage by weight, e.g., potato chip bags. The "Tetrapak" boxes were categorized as mostly paper (boxboard) and included in item 1d.

TABLE 8: FIELD DATA SHEET

Town:
Enumeration Area:
Sample :

(1) Paper (a) Newsprint				
(b) Fine Paper / CPO / Ledger				
(c) Magazines / Flyers				
(d) Waxed / Plastic / Mixed				
(e) Boxboard				
(f) Kraft				
(g) Wallpaper				
(h) OCC				
(i) Tissues				
(2) Glass (a) Beer (i) refillable				
(ii) non–refillable				
(b) Liquor & Wine Containers				
(c) Food Containers				
(d) SoftDrink (i) refillable				
(ii) non–refillable				
(e) Other Containers				
(f) Plate				
(g) Other				
(3) Ferrous (a) Soft Drink Containers				
(b) Food Containers				
(c) Beer Cans (i) returnable				
(ii) non–returnable				
(d) Aerosol Cans				
(e) Other				
(4) Non–Ferrous (a) Beer Cans (i) returnable				
(ii) non–returnable				
(iii) American				
(b) Soft Drink Containers				
(c) Other Packaging				
(d) Aluminum				
(e) Other				
(5) Plastics (a) Polyolefins				
(b) PVC				
(c) Polystyrene				
(d) ABS				
(e) PET				
(f) Mixed Blend / Coated				
(g) Nylon				
(h) Vinyl				
(6) Organic (a) Food Waste / Rodent Bedding				
(b) Yard Waste				
(7) Wood				
(8) Ceramics / Rubble / Fiberglass / Gypsum Board / Asbestos				
(9) Diapers				
(10) Textiles/Leather/Rubber				
(11) Household Hazardous Wastes (a) Paints / Solvents				
(b) Waste Oils				
(c) Pesticides/Herbicides				
(12) Dry Cell Batteries				
(13) Kitty Litter				
(14) Medical Wastes				
(15) BLUE BOX ITEMS (a) Newsprint				
(b) Liquor / Wine Bottles				
(c) Food Jars / Other Bottles				
(d) Food Cans (i) ferrous				
(ii) non–ferrous				
(e) Beer Cans (i) ferrous				
(ii) non–ferrous				
(iii) American				
(f) Pop Cans (i) ferrous				
(ii) non–ferrous				
(g) PET Bottles				
	TOTAL kg		TOTAL kg	

Rodent bedding (item 6a) was routinely encountered in small quantities of urine-soaked cedar shavings and faecal pellets. The material was included in the food waste category because of the putrescible nature of both of the components. Likewise, individual "packages" of canine excreta---presumably contributed by citizens obeying the "poop-and-scoop" statutes---were included in this category. Kitty litter (item 13) was more frequently encountered and because of the inorganic nature of the granular product, save for the associated feline excretory products, the two components were given a single, separate category.

Sanitary napkins were included in the paper category (item 1i).

Medical wastes (item 14) included medicines, insulin bottles and associated used syringes (needles protected and unprotected) and syringes without accompanying evidence of medicinal application.

Aerosol cans were collectively weighed and included in the ferrous section as item 3d. At the time, we felt that one category for ferrous/non-ferrous pressurized containers would be adequate.

2.2.3.10 Moisture Content

After the waste was sorted into the designated categories and weighed, samples of plastics, paper, food waste and disposable diapers were placed in large polyethylene bags and stapled shut. The bags were labelled with the appropriate sample numbered and then taken to the laboratory of the former Ontario Centre for Resource Recovery (now known as the Dufferin Transfer Station), Toronto. The contents of the bags were weighed in tared, aluminum baking pans (purchased in local supermarkets) and placed in the waste drying oven at 203 F(95 C) for 48 h. The samples were removed from the oven, cooled and reweighed to determine the weight loss due to evaporation of water.

A Sartorius top-loading balance (Model # 3802; 6 kg capacity ± 0.1 g) was used for the weight determinations.

2.2.3.11 Inorganic Analyses of Vacuum Cleaner Bag Contents

Bags of vacuum cleaner dust/fibre/hair were frequently encountered in residential waste. As the curbside separation of the residential waste stream is expanding beyond the bulky items presently included in municipal Blue Box programs, it was decided that the chemical composition of the contents of vacuum cleaner bags may be instructive, for example, with respect to the decision to employ a two versus three stream "wet-dry" separation procedure. That is, the heavy metal concentration in the acid-extractable fraction of the vacuum cleaner bag contents could determine whether to exclude these items from the category of waste that will be composted, i.e., due to growing concerns with heavy metal loadings in some kinds of compost prepared from residential waste streams.

While it may be argued that the chemical composition of commercial paints, coatings and inks---or the pigment in the bright yellow HDPE detergent bottles---may be available through Material Safety Data Sheets or on a "need-to-know" request, the inorganic composition of house dust may only be gained through empirical experience, i.e., direct chemical analysis. Furthermore, depending on the geographic location of a municipality, the amount of vehicular traffic occurring within it and local industry, one may hypothesize that there will be differences in the chemical composition of the contents of vacuum cleaner bags.

In the Town of Fergus, vacuum cleaner bags were saved and grouped by EA. One bag was chosen at random from each EA for analysis. Fibrous contents and dust were pulled from the selected bags, placed in acid-washed plastic jars and submitted to X-RAL INC. for a 30 element inorganic analysis by ICP spectroscopy, plus analyses for mercury (Hg) and arsenic (As).

A similar procedure was followed in the Borough of East York except that the pooled sample was made up from the vacuum cleaner bags collected from each EA. No analyses were performed on the bags collected in the City of North Bay.

2.2.3.12 BTU Analyses of Selected Components

The following samples of mixed plastic packaging were obtained from the residential waste stream, washed with detergent, thoroughly rinsed, oven dried (101 C) to a constant weight and submitted for BTU analysis: (1) prepackaged meat containers; (2) prepackaged bacon wrap; (3) plastic ketchup bottle. In addition, a new disposable diaper was similarly oven dried and submitted for BTU analysis.

2.2.4 Data Management

2.2.4.1 General Considerations

As noted in the preceding sections, data were collected at different points during the collection and sorting of residential refuse. Table 9, summarizes the kinds of data that were collected and the intended use of these data.

2.2.4.2 Calculation of Per Capita Generation Rate

<u>Estimation of the Per Capita Generation Rate in an EA</u>

Table 10 serves as an example of how per capita generation rates were computed from the sample data (Appendices A1, B1 & C1) for each EA. The example cited in Table 10 is EA 258 from the Town of Fergus. The weight of waste used for this calculation was made up of either household waste alone or household waste and Blue Box materials, depending on whether or not Blue Box materials were set out. In almost every case the number of houses setting

TABLE 9: SUMMARY OF DATA COLLECTED AND INTENDED USE OF THE RESULTS

Kind of data	Use of data
Weight of refuse samples collected en route in EAs; number of residences setting out bagged refuse and Blue Boxes	Calculation of per capita waste generation rates (apts. in Fergus; those < 30 units in East York)
Weight of components in bagged refuse and Blue Boxes after sorting	Calculation of percent(%) composition Calculation of Blue Box "capture rate" Calculation of moisture content of components in the refuse
Weight of components in bagged refuse collected from schools (East York) and single Christmas week residential collection (East York)	Calculation of per capita waste generation rates Calculation of percent(%) composition
Weight of yard waste collected en route in EAs	(not included as part of the present method development Study)
Chemical analyses	Inorganic analyses of vacuum cleaner bag contents BTU values for selected materials

TABLE 10: SAMPLE CALCULATION OF THE PER CAPITA GENERATION RATE IN AN EA. DATA FROM THE TOWN OF FERGUS, EA # 258

Town: Fergus
EA: 258 / high income; primarily single detached dwellings
Pop: 600
Dwellings: 205
PPD: 2.93

Sample Number	Dwellings with Refuse	Dwellings with Blue Boxes	Sampled Refuse Weight (kg)	Sampled Blue Box Weight (kg)	Daily Weight /Dwelling (kg/day)	Waste /person /day (kg)	S.E.
31	8	5	115.80	31.11	2.51	0.857	
32	11	5	96.39	26.38	1.63	0.556	
33	6	3	123.52	24.30	3.52	1.201	
34	8	7	96.82	39.50	2.13	0.728	
35	12	8	103.06	45.80	1.64	0.558	
36	9	7	113.69	37.20	2.18	0.745	
37	2	2	42.12	40.36	4.45	1.519	
38	5	5	89.83	15.58	2.79	0.952	
39	7	4	122.68	12.65	2.73	0.932	
40	11	6	141.71	22.39	2.11	0.719	
Sample Ave.	7.9	5.2	104.56	29.53	2.57	0.88	0.094

out Blue Boxes did not equal the number setting out other household refuse. A two-step calculation was required to account for this difference.

Note: A decision had to be made with respect to apportioning the weight of the Blue Box materials collected at curbside. Recycling coordinators from 4 municipalities in Ontario were contacted and asked about the average frequency of Blue Box set-out by residents. Where Blue Box monitoring had been carefully conducted (e.g., East York), a complex picture emerged which reflected demographics of the municipality, thickness of the newspapers, seasonality, etc. Nevertheless, an average set-out frequency of once every two weeks seemed to be a reasonable compromise, given a range of: more than 1 set-out per week to less than 1 set-out every 3 weeks. Thus, we have employed a conservative convention whereby the weight of Blue Box items was divided by two (2) before including these materials in calculations of per capita generation rates or percent composition.

The generation rate of household waste, excluding yard waste, was calculated as follows: The weight of household refuse sampled (column 3) was divided by the number of houses the sample was taken from (column 2). The weight of Blue Box material collected (column 4) was divided by 2, as noted above, and then divided by the number of houses were Blue Box materials had been set out. Next, these two weights were added together and then divided by 7 (days per week) to give a daily weight per dwelling (column 5).

The daily per capita generation rate (column 6) was calculated by dividing the daily weight per dwelling (column 5) by the population per dwelling (PPD) for the given EA.

As an example of the calculation, consider Table 10, Sample Number 31:

1. 115.8 kg (household refuse) divided by 8 (dwellings) = 14.47 kg per dwelling per week; then,

2. 31.1 kg (Blue Box materials) divided by 2 (weeks) = 15.55 kg per week; 15.55 kg Blue Box materials per week divided by 5 (dwellings) = 3.11 kg per dwelling per week; then,

3. [14.47 kg/dwelling plus 3.11 kg/dwelling] divided by 7 (days per week) = 2.51 kg/dwelling/day;

4. 2.51 kg/dwelling/day divided by 2.93 (population per dwelling) = 0.86 kg/capita/day.

The average per capita waste generation rate (kg/capita/day) of all 10 samples was determined after summing all values in Table 10 and dividing by the number of samples.

Thus the per capita waste generation for EA 258 (high income/primarily single detached dwellings) was 0.88 kg ± a Standard Error of 0.09. In other words, the "true" estimate of the average per capita generation rate of the EA lies within the range: 0.79 to 0.97 kg/capita/day.

2.2.4.3 Method to Estimate the "Capture Rate" of the Blue Box Program

The following method was used to estimate the "capture rate" of the Blue Box programs in the Town of Fergus and the Borough of East York. The total weight of Blue Box items in each sample was the sum of: (1) the weight of materials set out in Blue Boxes, divided by 2 as per the conservative convention noted above,; and (2) the weight of the same "potential" Blue Box items that were put out in the bagged refuse, rather than in Blue Boxes. The weight of material set out in the Blue Boxes (1) was divided by the sum of (1) and (2) determined above and then multiplied by 100. This gave the percent which the Blue Box materials represented of the total "municipally recyclable" and potentially collectable categories of materials in the residential waste stream.

2.2.4.4 Per Capita Generation Rate of Waste From Schools

Per capita generation rates were calculated using student population, number of teachers and support staff (administrators, clerical, janitors, etc.). In calculating the per capita generation rate for schools, a 5 day week was used to account for weekend closure of the institutions.

It may also be noted that, as only a single 100 kg (approximately) sample of waste was collected and sorted from each school, an average waste composition was computed by pooling the data from all of the schools. No statistical comparison of waste generation characteristics of the 3 categories of schools may be made.

2.2.5 White Goods and Bulk Item Data Collection Method

Characterization of white goods and bulk item waste generation requires a method that monitors the waste on a yearly basis, and monitors the entire municipality. The put-out rate for worn-out appliances, furniture and other bulk items can be expected to vary over the course of the year. For example, many communities may have a spring/fall clean-up at which time many tonnes of bulk items may be discarded, while for the rest of the year very few bulk items will enter the waste stream. Similarly bulk item put-out by residents will be sporadic and difficult to predict for the municipality being studied.

To determine generation rates of bulk items on a yearly basis, several communities were contacted that have kept accurate yearly records of tonnages of bulk items collected as part of their residential waste collection program. By contacting numerous communities, a broad spectrum of collection practices is represented. As well, a range of potential generation rates can be assessed.

2.2.5.1 Data Collection

Data were collected by telephoning the person responsible for waste collection in each community. This person would typically be the municipal engineer or the recycling co-ordinator. Additional correspondence by telephone or letter was often required to complete the survey and data collection.

Data requested of each community included:

1. tonnages of white goods collected on a weekly/monthly/yearly basis;
2. tonnages of other bulk items collected on a weekly/monthly/yearly basis;
3. description of the collection program for white goods/bulk items to identify data that may be biased or incomplete.

Population data for each community for various years was determined from the Ontario Municipal Directory. These data were used to calculate the per capita generation rate (tonne/capita/year) of white goods and bulk items.

2.2.5.2 Communities Reporting Data

A total of 18 communities was contacted by telephone to inquire about the availability of collection records of white goods and other bulky items. The following 10 communities were able to report collection data:

Town of Ajax
Borough of East York
City of Etobicoke
City of Mississauga
City of North York
City of Oakville
City of Toronto
Town of Whitby
County of Wellington
City of York

SECTION 3

RESULTS

3.0 RESULTS

3.1 Estimation of Per Capita Waste Generation Rates

3.1.1 Town of Fergus

Table 11 shows the per capita generation rates and the quantities of waste (kg/day) generated for the 5 EAs that were part of the sampling program. The following general equation is used:

OVERALL GENERATION RATE (kg/cap/day)

```
 Sum of cells          |    waste     |     |    EAs in the cell as     |
   A1-C3 in        =   | generation   |  x  |percentage of total number|
income/housing         |  rate in a   |     |of EAs in the municipality|
    matrix             | matrix cell  |     |   (for Study purposes)    |
```

EAs 255, 259 and 264 were not sampled in the study. The per capita waste generation rates were estimated for these EAs from the rates determined for the EAs that were sampled within the respective income / housing matrix cell (recall Tables 4 & 6). For example, EA 259 is in cell B2. The 0.80 kg per capita generation rate is the average of the two rates obtained from data for EAs 256 and 263 in matrix cell B2.

The average per capita generation rate for the 9 EAs, i.e., 0.804 kg/capita/day, was multiplied by the 1988 population of Fergus (6,757) to get the estimate of the daily rate of residential waste generation for the whole Town (exclusive of yard waste): 5,433 kg/day or 5.43 tonnes/day. The data are shown in Appendix A. (Note that Sample 51 EA 260, is omitted from per capita waste generation rate calculations due to excessive amounts of miscellaneous wastes which indicated that this was a non-representative sample).

We have attempted to check the accuracy of the residential waste generation estimate for the Town of Fergus in the following way.

TABLE 11: RESIDENTIAL WASTE GENERATION DATA INCORPORATED INTO THE INCOME/HOUSING MATRIX TO ESTIMATE THE WEIGHTED PER CAPITA GENERATION RATE (KG/CAPITA/DAY) FOR THE TOWN OF FERGUS.

	(1) Primarily Single Detached	(2) Mixed Dwellings	(3) Primarily Multiple Dwellings
(A) High Income	0.88 (11.1%)	0 (0%)	0 (0%)
(B) Medium Income	0.89 (22.2%)	0.80 (44.4%)	0.60 (11.1%)
(C) Low Income	0 (0%)	0 (0%)	0.78 (11.1%)

Medium Income; Mixed Dwellings (B2): Average of EAs 256 & 263

Weighted per capita generation rate (kg/capita/day) = 0.804

[1] Sample 51 from EA 260 is omitted from the calulation of Generation rate for Low Income; Primarily Multiple Dwellings due to excessive amount of miscellaneous material

- First, residential curbside collection tonnage was estimated from the total tipping charges that Plein Disposal Inc. incurred during the course of our Study in Fergus. It should be noted that this weight included commercial waste from stores located on St. Andrews Street and environs.

  $5,054/6 weeks ÷ $29.70/tonne = 170.2 tonnes/6 weeks
  170.2 tonnes/6 weeks ÷ 42 days/6 weeks = 4.05 tonnes/day

- Second, waste from apartments and "condominiums" in Fergus was collected by McLellan's Disposal Services Limited. According to their records, 100 cu yd of uncompacted waste were picked up weekly form these premises. Using an estimated weight of 250 lbs/cu yd, the following tonnage may be calculated:
  (100 cu yd/wk x 6 wks x 250 lbs/cu yd) ÷ (2.2 lb/kg x 42 days = 1,623 kg/day or 1.6 tonnes/day

- Third, McLellan's Disposal Services Limited also estimated that they picked up 37.7 tonnes of Blue Box items over that 42 day period, or 0.90 tonnes/day.

- Fourth, the total weight of materials (including Blue box and yard waste) collected curbside over that time by the study team was 7.3 tonnes or 0.17 tonnes/day.

The TOTAL of these four separate quantities is 6.72 tonnes/day. This number includes commercial waste, noted above, as well as yard waste. The Study estimate, derived from the per capita generation rate, is 5.43 tonnes/day and does not include yard waste, which is on the order of 20% of the weight of the total waste stream collected by the Study team.

The average population per dwelling in Fergus is 2.63 (Table 11). The average per capita generation rate of 0.804 kg/capita/day (or 1.77 lbs/capita/day) = 5.63 kg/capita/wk (or 12.4 lbs/capita/wk). It should be reiterated that the Fergus data do not include yard wastes.

3.1.2 City of North Bay

Appendix B gives the data obtained for each EA that was sampled. Table 12 reports the per capita generation rate calculated for the study enumeration areas.

The estimated average per capita generation rate of residential waste in North Bay for the medium income brackets is 0.93 kg/capita/day, exclusive of yard waste.

3.1.3 Borough of East York

The income/dwelling matrix in Table 13 accounts for 95% of the EAs in the Borough of East York. Appendix C, herein, gives the data obtained for each EA that was sampled during the course of the study, including the data for the schools and the Christmas collection of refuse in EA 90-117.

Table 13 shows how the per capita generation rates calculated from the sample data are used to estimate the overall generation rate for the Borough of East York.

The estimated average per capita generation rate of residential waste in the Borough of East York was 0.99 kg/capita/day, exclusive of yard waste and leaves.

TABLE 12: RESIDENTIAL WASTE GENERATION DATA INCORPORATED INTO THE INCOME/HOUSING MATRIX TO ESTIMATE THE WEIGHTED PER CAPITA GENERATION RATE (KG/CAPITA/DAY) FOR THE CITY OF NORTH BAY.

	(1) Primarily Single Detached	(2) Mixed Dwellings	(3) Primarily Multiple Dwellings
(A) High Income	NA (19.3%)	NA (3.5%)	0 (0.0%)
(B) Medium Income	0.89 (17.5%)	0.97 (26.3%)	0 (0.0%)
(C) Low Income	NA (10.5%)	NA (21.0%)	NA (1.8%)

Matrix cells A1, A2, C1, C2, C3 were not sampled

Average per capita generation rate of cells B1 and B2, (kg/capita/day) = 0.93

TABLE 13: RESIDENTIAL WASTE GENERATION DATA INCORPORATED INTO THE INCOME/HOUSING MATRIX TO ESTIMATE THE WEIGHTED PER CAPITA GENERATION RATE (KG/CAPITA/DAY) FOR THE BOROUGH OF EAST YORK.

	(1) Primarily Single Detached	(2) Mixed Dwellings	(3) Primarily Multiple Dwellings
(A) High Income	1.29 (7.6%)	0.83 (10.0%)	1.06 (3.5%)
(B) Medium Income	1.17 (12.9%)	1.10 (20.0%)	1.04 (14.7%)
(C) Low Income	0 (0.0%)	1.00 (4.7%)	0.75 (26.5%)

Generation rate for matrix cell A3 is the average of the cells A1 & A2

Weighted per capita generation rate (kg/capita/day) = 0.99

3.2 Composition of Residential Waste Exclusive of Yard Waste

3.2.1 Town of Fergus

Data for the composition of the residential waste stream in the 6 EAs is given in Appendix A1. Table 14 is the estimated average waste composition for the Town determined by weighting the means from each EA using the income housing matrix. Because we are using a series of weighted averages for each waste component, the total composition for a particular municipality will not necessarily sum to a total of 100 percent.

Figure 14 is a bar graph showing the percent food waste data, ± 1 Standard Error (SE). It will be recalled that both sample size (minimum weight = 100 kg) and sample number (9 to 10 per EA) were needed to achieve an accuracy of 90% and a precision of ± 15% for the food waste fraction only. Two sample means are different from each other if their standard errors do not overlap.

3.2.2 City of North Bay

Data for the composition of the residential waste stream in the 2 middle income EAs is given in Appendix B1. Table 14 gives the estimated average waste composition for the City, based on a sample averaging of the available data. The statistically significant food waste data, ± 1 SE, are graphed in Figure 15.

3.2.3 Borough of East York

Data from the composition of the residential waste stream in the 7 EAs is given in Appendix C1. Table 14 is the estimated average waste composition for the Borough, determined by weighting the means from each EA, using the income dwelling matrix.

Figure 16 is a bar graph showing the % food waste data, ± 1 SE.

TOWN OF FERGUS, BOROUGH OF EAST YORK, AND
THE CITY OF NORTH BAY

	Fergus			East York			North Bay	
	Percent Composition: Regular Waste and Blue Box	Percent Composition: Combined Waste Streams	Per Capita Generation (kg/cap/day) Combined Waste Streams	Percent Composition: Regular Waste and Blue Box	Percent Composition: Combined Waste Streams	Per Capita Generation (kg/cap/day) Combined Waste Streams	Percent Composition: Total Waste Stream	Per Capita Generation (kg/cap/day) Total Waste Stream
(1) Paper (a) Newsprint	3.21%	10.26%	0.083	15.11%	18.99%	0.166	10.55%	0.098
(b) Fine Paper / CPO / Ledger	1.87%	1.87%	0.015	1.65%	1.65%	0.016	1.76%	0.016
(c) Magazines / Flyers	4.22%	4.22%	0.034	4.71%	4.71%	0.046	3.14%	0.029
(d) Waxed / Plastic / Mixed	2.06%	2.06%	0.017	2.37%	2.37%	0.023	2.11%	0.020
(e) Boxboard	5.00%	5.00%	0.040	4.03%	4.03%	0.040	4.24%	0.040
(f) Kraft	1.30%	1.30%	0.012	1.30%	1.30%	0.013	1.12%	0.010
(g) Wallpaper	0.42%	0.42%	0.003	0.20%	0.20%	0.002	0.70%	0.007
(h) OCC	3.05%	3.05%	0.025	2.88%	2.95%	0.029	2.81%	0.026
(i) Tissues	3.96%	3.96%	0.032	3.65%	3.63%	0.036	3.62%	0.034
SUBTOTAL (for Category)	27.31%	32.39%	0.260	35.91%	39.86%	0.394	30.01%	0.280
(2) Glass (a) Beer (i) refillable	0.07%	0.07%	0.001	0.10%	0.10%	0.001	0.27%	0.003
(ii) non-refillable	0.05%	0.06%	0.000	0.03%	0.03%	0.000	0.05%	0.001
(b) Liquor & Wine Containers	1.00%	2.00%	0.016	1.40%	1.99%	0.020	1.71%	0.016
(c) Food Containers	3.18%	4.46%	0.036	1.56%	2.13%	0.021	3.61%	0.034
(d) Soft Drink (i) refillable	0.06%	0.06%	0.001	0.10%	0.10%	0.001	0.06%	0.001
(ii) non-refillable	0.25%	0.25%	0.002	0.19%	0.19%	0.002	0.45%	0.004
(e) Other Containers	0.09%	0.09%	0.001	0.07%	0.07%	0.001	0.17%	0.002
(f) Plate	0.03%	0.03%	0.000	0.19%	0.19%	0.002	0.07%	0.001
(g) Other	0.54%	0.54%	0.004	0.82%	0.82%	0.006	0.45%	0.004
SUBTOTAL (for Category)	5.28%	7.58%	0.061	4.45%	5.62%	0.055	6.86%	0.064
(3) Ferrous (a) Soft Drink Containers	0.42%	0.56%	0.005	0.16%	0.19%	0.002	0.77%	0.007
(b) Food Containers	1.63%	2.37%	0.019	1.55%	1.91%	0.019	3.62%	0.034
(c) Beer Cans (i) returnable		0.02%	0.000	0.00%	0.00%	0.000		
(ii) non-returnable				0.00%	0.00%	0.000		
(d) Aerosol Cans	0.37%	0.37%	0.003	0.15%	0.15%	0.001	0.19%	0.002
(e) Other	1.10%	1.10%	0.009	1.53%	1.53%	0.015	1.49%	0.014
SUBTOTAL (for Category)	3.71%	4.44%	0.036	3.39%	3.79%	0.037	6.08%	0.057
(4) Non-Ferrous (a) Beer Cans (i) returnable	0.04%	0.09%	0.001	0.07%	0.08%	0.001	0.25%	0.002
(ii) non-returnable	0.09%	0.09%	0.001	0.00%	0.00%	0.000	0.01%	0.000
(iii) American	0.00%	0.01%	0.000	0.03%	0.04%	0.000	0.06%	0.001
(b) Soft Drink Containers	0.16%	0.41%	0.003	0.25%	0.56%	0.004	0.51%	0.003
(c) Other Packaging	0.00%	0.11%	0.001	0.06%	0.06%	0.001	0.01%	0.000
(d) Aluminum	0.46%	0.46%	0.004	0.51%	0.51%	0.003	0.19%	0.002
(e) Other	0.10%	0.10%	0.001	0.17%	0.17%	0.002	0.11%	0.001
SUBTOTAL (for Category)	0.88%	1.27%	0.010	0.90%	1.02%	0.010	0.95%	0.009
(5) Plastics (a) Polyolefins	6.40%	6.40%	0.051	4.95%	5.04%	0.050	5.04%	0.047
(b) PVC	0.20%	0.20%	0.002	0.06%	0.06%	0.001	0.06%	0.001
(c) Polystyrene	0.66%	0.66%	0.005	0.69%	0.69%	0.007	1.95%	0.013
(d) ABS	0.05%	0.06%	0.000	0.04%	0.04%	0.000	0.06%	0.001
(e) PET	0.09%	0.16%	0.001	0.11%	0.12%	0.001	0.19%	0.002
(f) Mixed Blend Plastic	0.55%	0.55%	0.004	0.30%	0.30%	0.003	0.56%	0.005
(g) Coated Plastic	- N/A -	- N/A -		0.14%	0.14%	0.001	0.16%	0.002
(i) Nylon	0.34%	0.54%	0.003					
(i) Vinyl	0.35%	0.35%	0.005	0.06%	0.06%	0.001	1.06%	0.010
SUBTOTAL (for Category)	8.64%	8.73%	0.070	6.35%	6.45%	0.064	8.52%	0.080
(6) Organic (a) Food Waste / Rodent Bedding	28.76%	28.76%	0.251	23.51%	23.51%	0.232	26.07%	0.243
(b) Yard Waste								
SUBTOTAL (for Category)	28.76%	28.76%	0.231	23.51%	23.51%	0.252	26.07%	0.245
(7) Wood	1.39%	1.39%	0.011	0.90%	0.90%	0.009	3.69%	0.034
(8) Ceramics / Rubble / Fiberglass /	1.55%	1.55%	0.012	1.77%	1.77%	0.017	2.16%	0.020
Gypsum Board / Asbestos	0.28%	0.28%	0.002					
SUBTOTAL (for Category)	1.83%	1.83%	0.015	1.77%	1.77%	0.017	2.16%	0.020
(9) Drapers	4.55%	4.55%	0.035	2.99%	2.99%	0.030	5.02%	0.047
(10) Textiles/Leather/Rubber	4.18%	4.18%	0.034	4.63%	4.63%	0.046	4.47%	0.042
(11) Household Hazardous (a) Paints / Solvents	0.34%	0.34%	0.003	0.33%	0.33%	0.003	0.92%	0.004
Wastes (b) Waste Oils	0.09%	0.09%	0.001	0.06%	0.06%	0.001	0.00%	0.000
(c) Pesticides/Herbicides	0.01%	0.01%	0.000	0.01%	0.01%	0.000	0.01%	0.000
SUBTOTAL (for Category)	0.44%	0.44%	0.004	0.45%	0.43%	0.004	0.41%	0.004
(12) Dry Cell Batteries	0.07%	0.07%	0.001	0.23%	0.23%	0.002	0.04%	0.000
(13) Kitty Litter	3.26%	3.26%	0.026	1.66%	1.66%	0.016	2.00%	0.019
(14) Medical Wastes	0.07%	0.07%	0.001	0.06%	0.06%	0.001	0.06%	0.001
(15) Miscellaneous	0.80%	0.80%	0.006	1.45%	1.45%	0.014	2.69%	0.027
(16) Ashes	- N/A -	- N/A -	- N/A -	- N/A -	- N/A -	- N/A -	0.77%	0.007
(17) BLUE BOX ITEMS (a) Newsprint	5.06%	- N/A -	- N/A -	5.87%	- N/A -	- N/A -	- N/A -	- N/A -
(b) Liquor / Wine Bottles	1.00%	- N/A -	- N/A -	0.59%	- N/A -	- N/A -	- N/A -	- N/A -
(c) Food Jars / Other Bottles	1.30%	- N/A -	- N/A -	0.58%	- N/A -	- N/A -	- N/A -	- N/A -
(d) Food Cans (i) ferrous	0.55%	- N/A -	- N/A -	0.37%	- N/A -	- N/A -	- N/A -	- N/A -
(ii) non-ferrous	0.11%	- N/A -	- N/A -	0.00%	- N/A -	- N/A -	- N/A -	- N/A -
(e) Beer Cans (i) ferrous	0.02%	- N/A -	- N/A -	0.00%	- N/A -	- N/A -	- N/A -	- N/A -
(ii) non-ferrous	0.04%	- N/A -	- N/A -	0.01%	- N/A -	- N/A -	- N/A -	- N/A -
(iii) American	0.01%	- N/A -	- N/A -	0.00%	- N/A -	- N/A -	- N/A -	- N/A -
(f) Pop Cans (i) ferrous	0.16%	- N/A -	- N/A -	0.04%	- N/A -	- N/A -	- N/A -	- N/A -
(ii) non-ferrous	0.23%	- N/A -	- N/A -	0.11%	- N/A -	- N/A -	- N/A -	- N/A -
(g) PET Bottles	0.09%	- N/A -	- N/A -	0.01%	- N/A -	- N/A -	- N/A -	- N/A -
(h) Plastic Jugs	- N/A -	- N/A -	- N/A -	0.09%	- N/A -	- N/A -	- N/A -	- N/A -
(i) OCC	- N/A -	- N/A -	- N/A -	0.07%	- N/A -	- N/A -	- N/A -	- N/A -
SUBTOTAL (for Category)	8.59%	- N/A -	- N/A -	7.74%	- N/A -	- N/A -	- N/A -	- N/A -

* Percent composition of each component is calculated using a "weighted average" of all EAs sampled in the respective municipality. Therefore the percent composition for a municipality may not sum to 100%

** Percent composition of Blue Box materials are calculated using the bi-weekly put-out rate as described in Section 2.2.4.2

TABLE 18: CONCENTRATION OF HEAVY METALS (UG/G) IN EXTRACTS PREPRARED FROM THE CONTENTS OF VACUUM CLEANER BAGS RECOVERED FROM RESIDENTIAL WASTE IN EAST YORK

	Enumeration Area						
Metal	603	055	213	303	168	117	005
Alumimum	1100	690	2800	1700	1100	1500	560
Arsenic	3.6	0.8	2.9	2.5	3.8	8.0	3.2
Barium	110	12	66	61	56	41	21
Beryllium	<1.0	<1.0	<1.0	<1.0	1.2	<1.0	<1.0
Boron	33	14	8.5	18	32	9.7	8.8
Cadmium	5.2	2.6	3.3	17	3.8	3.4	2.6
Calcium	18000	11000	15000	9100	32000	18000	7400
Chromium	38	72	33	62	50	120	24
Cobalt	1.8	1.5	3.5	5.8	2.7	2.6	1.9
Copper	57	46	67	43	58	120	27
Iron	2900	1400	4800	1300	3100	3500	1200
Lead	140	14	68	74	120	110	160
Lithium	3.2	<1.0	2.9	2.0	1.4	1.5	2.6
Magnesium	1700	680	2800	1700	1100	1500	580
Manganese	64	24	160	34	90	64	35
Mercury	2.99	0.91	0.98	1.05	5.95	3.15	7.46
Molybdenum	<1.0	<1.0	1.5	1.6	<1.0	<1.0	<1.6
Nickel	10	4.7	18	9.4	16	18	8.6
Phosphorus	1000	600	600	400	400	500	1000
Potassium	2500	2100	3000	1900	2600	1600	2000
Silver	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Sodium	55000	5800	6100	8900	3800	3300	28000
Strontium	52	18	39	23	40	29	24
Scandium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tin	<10	<10	10	<10	<10	<10	18
Titanium	<20	<20	200	<20	30	40	20
Tungsten	<10	<10	<10	<10	<10	<10	<10
Vanadium	<1.0	2.0	6.6	<1.0	<1.0	1.6	<1.0
Yttrium	<1.0	<1.0	2.1	<1.0	1.0	1.0	<1.0
Zinc	520	230	330	250	310	500	160
Zirconium	<1.0	1.5	3.9	<1.0	1.7	66.0	5.0

TABLE 19: HEATING VALUES (DRY BASIS) FOR MIXED PLASTICS AND DISPOSABLE DIAPERS

Component Analysed	BTU/lb	kJ/kg
Plastic prepacked meat container	15580	36127
Plastic bacon wrap	19100	44289
Plastic ketchup container	22500	52173
Disposable diaper	10150	23536

1 BTU/lb = 2.319 kJ/kg

3.8.3 Borough of East York

The raw data for yard waste are found in Appendix C2.

3.9 Estimation of the "Capture Rate" of the Blue Box Programs

Estimation of the "Capture Rate" of the Blue Box programs in the Town of Fergus and the Borough of East York are Shown in Tables 20 and 21, respectively. Note that the conservative estimate of Blue Box material, as discussed in Section 2.2.4.2, was employed for the amount of material in the Blue Boxes.

3.10 The Effect of Life Style On Residential Waste Characteristics

As we noted in Section 2.1, the method used in the Study was based on the hypothesis that the characteristics of a residential waste stream are related to the socioeconomic life styles of people and the demographic characteristics of a municipality. In Table 22, the per capita generation rates of total residential waste and the quantity of kitchen waste (putrescible matter) for the Town of Fergus and the Borough of East York are compared on the basis of income level and dwelling type. The East York data show that residents in detached dwellings generate more waste than those living in multiple dwellings. The data for the middle income group in the Town of Fergus also suggest this relationship. Other trends in the total waste generation data are less evident.

The generation rates of the kitchen waste (putrescible matter) tended to follow the pattern set by the per capita generation rate of total refuse, but as noted earlier, a potential sampling bias may have underestimated the Borough of East York medium and low income/multiple dwelling kitchen refuse. The uncertainty in the Borough of East York multiple residential waste composition data is not

TABLE 20: AN ESTIMATION OF THE "CAPTURE RATE" OF THE BLUE BOX PROGRAM IN EACH STUDY EA IN THE TOWN OF FERGUS.

EA/Classification	Total wt of recyclables generated in curbside waste (kg)	Weight of recyclables in Blue Boxes (kg)	"Capture Rate" (wt of recyclables) in Blue Boxes as a % of total recyclables generated in curbside waste)
258 / High income primarily single detached	226.2	147.6	65.2
262 / Medium income primarily single detached	214.2	89.3	41.6
263 / Medium income primarily mixed dwelling	183.0	60.2	32.9
256 / Medium income primarily mixed dwelling	248.6	133.2	53.5
257 / Medium income primarily multiple dwelling	289.3	47.5	16.4[1]
260 / Low income primarily multiple dwelling	202.6	68.1	33.6[1]

[1]Apartment buildings do not have Blue Boxes

TABLE 21: AN ESTIMATION OF THE "CAPTURE RATE" OF THE BLUE BOX PROGRAM IN EACH STUDY EA IN THE BOROUGH OF EAST YORK

EA / Classification	Total Wt of recyclables generated in curbside waste (kg)	Wt of recyclables in Blue Boxes (kg)	"Capture Rate" (wt of recyclables in Blue Boxes as a % of total recyclables generated in curbside waste)
603 / High income single detached	375.8	253.0	67.3
117 / High income mixed residential	328.9	171.1	52.0
055 / Medium income high-rise apartment building	322.4	0.0	0.0[1]
168 / Medium income single detached	255.2	143.6	56.3
213 / Medium income mixed residential	349.7	154.8	44.3
303 / Low income mixed residential	245.5	117.9	48.0
005 / Low income high-rise apartments and townhouses	274.0	0.0	0.0[1]
East York Schools	118.6	17.0	14.4

[1] High-rise apartment buildings do not have Blue Box programs

present in the data from the Town of Fergus because the refuse from tenants was bagged but not compacted. The data for the middle income population in the Town of Fergus indicates a convincing trend, suggesting that more food waste is generated by the residents of detached dwellings than those living in multiple dwellings. The potential underestimation of the quantity of the components in the residential refuse from multiple dwellings in the Borough of East York, will exaggerate the difference in kitchen waste generation rates in the detached versus multiple dwelling data.

As the food waste fraction is the only fraction of the residential waste stream where there is some statistical confidence, the per capita generation of food waste by the Town of Fergus and the Borough of East York are compared in the right hand column of Table 22. EA matrix weighting factors were employed to obtain an overall estimate of the per capita generation rate of food waste in the two municipalities. It is interesting to note that the per capita generation rate of kitchen waste in the Town of Fergus, 0.23 kg/cap/day, represented 28.8% of the residential waste stream (see Table 14), while the comparable values for the Borough of East York were: 0.25 kg/cap/day and 25.5%.

3.11 White Goods and Bulk Items: Estimation of Per Capita Generation Rates

Data were collected from 10 communities regarding tonnages of white goods and non-metal bulk items generated. Data for non-metal bulk items collected were available for only 4 of the 10 communities. Generation rates (tonne/capita/year) were based on population data for 1985 and 1988 as reported in the Ontario Municipal Directory.

3.11.1 White Goods Generation Rate

The average generation rate for white goods (metal appliances etc.) is 0.0015 (tonne/capita/year) $\pm$0.00018 (data in Appendix F).

TABLE 22: EVIDENCE FOR THE EFFECT OF LIFE-STYLE (E.G. HOUSING TYPE) ON RESIDENTIAL WASTE GENERATION

EA	Income/dwelling	Total waste: per capita generation rate (kg/cap/day)	Putrescible per capita generation rate (kg/cap/day)	EA matrix weighting factor (%)		Putrescible content --EA weighted per capita generation rate (kg/cap/day)
	Town of Fergus					
258	high/single detached	0.88	0.24	11.11		0.027
262	medium/single detached	0.89	0.29	22.22		0.065
256,263	medium/mixed	0.80	0.22	44.44		0.096
257	medium/multiple	0.60	0.18	11.11		0.020
260	low/multiple	0.78	0.22	11.11		0.024
					Total	0.232
	Borough of East York					
65-003	high/single detached	1.29	0.28	7.60		0.021
90-117	high/mixed	0.83	0.21	10.00		0.021
90-168	medium/single detached	1.17	0.32	12.90		0.041
05-213	medium/mixed	1.10	0.38	20.00		0.075
12-055	medium/multiple	1.04	0.18	14.70		0.026
05-303	low/mixed	1.00	0.33	4.70		0.016
90-005	low/multiple	0.75	0.19	26.50		0.051
					Total	0.252

3.11.2 Non-Metal Bulk Item Generation Rate

The average generation rate for other bulk items (non-metal) is 0.0172 (tonne/capita/year) ± 0.0032 (data in Appendix F).

SECTION 4

DISCUSSION

4.0 DISCUSSION

4.1 General

The methods developed in the present Study are based on the hypothesis that residential waste generation is a function of people's habits and lifestyles. Both economic status and type of housing are two factors that may influence waste generation patterns; cultural background is another. As mentioned in the **Introduction**, this working hypothesis is well supported by the data of W. Rathje and associates and their pioneering studies in the cities of Milwaukee, Wisconsin, and later, in Phoenix, Arizona (refs. 34, 35 & 36).

The scope of the present study precluded an opportunity to profile the residential waste generation characteristics of a single municipality with the depth and detail achieved by Rathje and associates. Nevertheless, the essential elements that we have presented herein are sufficient for any municipality in Ontario to use as guidelines in the development of a detailed residential waste study.

In the following paragraphs we will critically review the methods that we employed so that potential users of the procedures can have the advantage of our experience. In some cases, the need for refinement in sampling procedures will be identified; suggestions will be offered. One of the major problems that we encountered was attributed to municipal recycling programs that served residents of detached dwellings but not apartment buildings, and the sampling problems created by these practices.

4.2 Income / Housing Matrix For the Three Study Municipalities

The EAs from each municipality were placed into the appropriate cells of the income/housing matrix (cf. Table 4) in Sections 2.2.1.2 to 2.2.1.6. The

procedure for determining the "absolute" numerical, or dollar, boundaries between the low, medium and high income groups was also described in Section 2.2.1.2 and Figure 3 compares the income boundaries for the three municipalities. The boundary between the low and middle income groups for the three municipalities ranged from $27,670 to $28,400, a narrow spread of about $1,200. However, there was a much greater spread of about $5,700 between the middle and high income boundaries. In other words, a large portion of the high income grouping for the Town of Fergus would be considered part of the middle income grouping for the Borough of East York. Is this an important factor to consider while evaluating the method employed in the present Study? No, it is not. The following points highlight the socio-demographic features of the approach.

1. Each municipal population was objectively assessed with respect to available Statistics Canada data on income and housing.

2. Low, middle and high income brackets are relative to individual municipalities and are based on the mean income which was calculated from Statistics Canada information on the average income within the EAs of the municipality. Other important parameters such as population age, sex, ethnic background, etc. could also be used in designing a residential waste sampling program, given time, budget and manpower to pursue a study at this level of detail.

3. Residential waste generation is a complex social phenomenon which cannot be quantified with the accuracy and precision that is comfortable and familiar to engineering and scientific disciplines. Nevertheless, there are acknowledged "parameters" which have been shown to be correlated with residential waste generation habits (cf. Rathje's studies, refs. 34, 35 & 36, among others). As long as municipalities take these parameters into account when they are evaluating their own, individual

population's waste generation characteristics, the appropriate waste management programs can be planned.

4.3 "Verification" of the Method

Verification of the results of a scientific investigation may be carried out in a number of ways. The investigator may repeat the initial work several times, under the same conditions, in order to determine the reproducibility of the results and the reliability of the method. In order to avoid any personal bias, the work maybe carried out by others, following the procedures initially described by the original investigator. Complications arise when the phenomenon under observation/investigation undergoes periodic fluctuations, or is at least suspected of such oscillations or changes. In this case, choosing the right time to repeat the work may be a critical factor in evaluating both the results and the worthiness of the method. Frequently, alternative procedures may be used to confer confidence or non-confidence on the method under scrutiny.

In the present Study, we have worked to develop a method to characterize and quantify a social phenomenon: residential waste generation. With respect to the amplitude in the annual cycle in waste generation, Figure 1-2 in Vesilind & Reimer (ref. 47) indicates that, for 75% of the year the weekly generation rate will be within ± 10% of the yearly average. The residential data reported by Brickner (ref. 7) supports this notion. The waste composition Studies reported herein were conducted during the summer, fall and winter; and in southwestern and in a more northerly portion of Ontario. From a theoretical point of view, if one wanted to check the accuracy of the waste data and determine the variance of the estimate, the same seasonal "windows" and geographic locations would have to be studied for several years in a row.

A municipality may choose to undertake this yearly monitoring for purposes of tracking progress in waste reduction initiatives. We (the Study) could not

undertake this task ourselves. A yearly monitoring program would have to decide whether, for example, an observed reduction in waste generation was a result of: (1) packaging laws or consumer purchasing practices (2) social changes in the community or (3) the methodology employed.

However, an attempt was made to verify the Study estimates of per capita waste generation for the Town of Fergus by piecing together waste collection estimates from commercial haulers for the same time period (see Section 3.1.1). Allowing for the uncertainties in the information assembled in the latter manner---and making some assumptions about yard waste generation---it seems that the Study method for estimating the per capita waste generation rate, exclusive of yard waste and leaves, yielded an acceptable result.

4.4 Apartment Buildings: Source of Greatest Number of Problems

We have identified some of the problems that may potentially affect the estimation of both the per capita waste generation rate and the percent composition of the waste stream.

Per Capita Waste Generation Rate

Within a similar income grouping in the income housing matrix, the per capita waste generation rates that we determined for residents of apartment buildings were usually lower than those determined for the residents of largely detached dwellings. While we believe that the results underlie real differences in the lifestyles between residents of apartment buildings and detached dwellings [Note: anecdotal evidence of geographers supports this conclusion, although according to Dr. J. Simmons, Geography Department, University of Toronto, (pers. commun.), there is a paucity of documented observations], there is one potential source of error which could lead to a low estimate of the per capita waste generation rate.

We employed the Statistics Canada data for the average population per unit dwellings in the EAs and we have assumed that all of the inhabitants of the apartment units contributed refuse. We did not verify the assumption of 100% refuse "set out" by every apartment unit. In the case of the small apartments in the Town of Fergus and the City of North Bay, we checked the number of units occupied in each building. For the Borough of East York, we know (pers. commun., Dr. J. Simmons) that the vacancy rate of apartments (in Metro Toronto) is exceedingly low and therefore the residential population in the apartments may be accurately reflected by multiplying the number of units by the average population per unit, using Statistics Canada data for the appropriate EA.

In our Study, the weight of refuse generated by the East York apartment buildings, that were EAs unto themselves, was the sum of: 1) - the quantity of refuse removed from the refuse containers for waste composition analyses and 2) - the weight of remaining refuse in the containers. The latter weight was reported by the hauler at the time of weigh-in and disposal of the apartment's refuse at the Bermondsey Transfer Station. It is possible, but unlikely, that significant errors in the weighing resulted in the low per capita generation rates calculated for the two apartment EAs in the Borough of East York.

The most likely source of error was, therefore, the assumption that refuse was contributed from every unit. If this was not true, then we have under estimated the per capita waste generation, (i.e., the total weight of refuse should have been divided by a smaller population of waste-disposing tenants).

The composition and per capita generation rate attributed to apartment buildings may be influenced by two kinds of tenant population dynamics. First, tenant turn-over normally occurs at the end of every month, therefore the amount of waste generated by tenants coming and going will be higher than the normal waste generation rate. Second, the largest number of tenant changes occur at the end of the school year (May-June) and again at the end of August. These

are two periods when per capita generation rates in apartment buildings could be expected to exceed the normal yearly average.

Waste Composition: Potential Sampling Biases

The refuse generated in apartment buildings in the Town of Fergus and small apartment buildings (< 30 units) in the Borough of East York and City of North Bay was not compacted. Random samples were unbiasedly taken from accumulations of this household or "unit" refuse. In Section 2.1 we noted the lack of a Blue Box collection for apartment buildings in the Town of Fergus and the set-out of recyclable materials by some of the tenants of the small apartment buildings in the Borough of East York.

In contrast however, the household refuse was compacted in the two "apartment EAs" in the Borough of East York. We think that the combination of refuse compacting and the lack of Blue Box programs for these buildings jointly contributed to a waste sampling bias at these locations. The difficulty in removing "random" samples from the compacted bins may be attributed to: 1) an overwhelming quantity of newsprint, co-mingled with other refuse [because there was no Blue Box (waste management alternative) program in these premises]; 2) wet refuse which was generally bagged in polyethylene supermarket shopping bags. The bags were lodged (compacted with other refuse) in ways which made it difficult to remove them without tearing. When bags were torn, the contents became distributed over the refuse in a bin, making quantitative retrieval of the spilled waste very difficult. We encountered many bags that were already torn, presumably a result of the compacting process.

Thus, the 60 and 40 kg quantities of refuse that were taken for the waste composition analysis were predisposed to have a larger weight of newsprint and a lower quantity of waste contained in small polyethylene bags for a combination of reasons: 1) no alternative disposal for the newsprint was at hand for the

tenants; 2) it was easier to remove the newsprint from the compacted refuse; and 3) for detached dwellings, the weight of Blue Box materials was not included as part of refuse weight guideline of 100 kg that we collected at the curb for the waste composition study. The last factor (3) is critical and points out a weakness in the methodology. We recommend the following procedural change in order to get around the sampling bias.

The suggested procedure relates the weight of waste to be sampled with a component in the tenant's household refuse. The component must meet one criterion: it must only be collected by "regular garbage" service, with no options for diversion (i.e., Blue Box).

At the present time, we suggest that the food scrap component of household refuse makes the best "normalization" basis or guideline for this kind of sample collection. We will assume from experience that food waste represents about 27% of the household waste and it always is disposed of in the "regular garbage". For the time being we will also assume that backyard composting is not an option practised extensively by residents in apartment buildings.

We can still apply the 60 / 40 ratio to determine the relative quantities of waste to sample on days one and two, respectively. On day one, we would randomly remove sufficient refuse from the compacted waste so that the sample contained a minimum of 27% x 60, or approximately 16 kg of bagged refuse with food scraps, irrespective of the quantity of newsprint (and all other materials) that were collected during the random sampling.

The same procedure could be used on day two, except that 27% x 40, or 11 kg of bagged refuse with food scraps could have been collected as the guideline for the sample size. In this way, the two samples would have been "normalized" with respect to the general low percentage of newsprint that was found in residential "regular garbage" wherever municipal Blue Box programs were in place. Of course the weight of newsprint (and all other materials) would

be recorded as usual, but the distortion of the percent composition results would be minimized. This point is considered further in Section 4.5.

4.5 Percent Composition: A Useful or Confusing Concept?

Is "percent composition" a useful or a confusing concept? The report by Brickner (ref. 7) illustrates the major issue raised by the question, that is: the quantitative "illusion" created by manipulating absolute quantities of per capita generated wastes in relative terms of a percentage of an arbitrarily defined, "total" waste stream. In Table 2 of ref. 7, there are four quantities (total weights) of materials in the waste stream. Brickner shows that while the weight of a component does not change, its "percent" contribution to the total waste stream may be made to change, depending on the **NUMBER** of categories of components in the waste stream. The lesson from this is that waste composition data, presented as "percentage" of the total waste stream are not readily comparable if the same components are not present in the sets of data under comparison. One may attempt to adjust waste composition data by eliminating or combining categories of materials. However, if certain materials are presented in combination at the outset, e.g., a single category for both food & yard wastes, useful manipulations are precluded.

The conversion of finite quantities of a given waste to a percentage basis, subjects the particular material to a mathematical relationship of "interconnectedness" which does not exist in terms of the generation of the waste. The sizing of waste management facilities (e.g., materials recovery facilities for recyclables, centralized or backyard composting facilities, etc.) is based on the best estimates of quantities of certain waste streams that are generated in a municipality. The graphic, frequently pie-shaped depiction of waste composition data (see references cited for some of the data in Tables 1 & 2), is visually appealing but does not convey the important information that planners of waste management facilities need to know. An example of the

distortion that can result from using percentage calculations, without providing quantitative, per capita generation rates of the individual components, is illustrated in the handling of yard waste data (see also Tables 1 & 2 in Brickner; ref. 7).

A temporal component must be included as well. Yard waste production and leaf fall are seasonal events in Ontario. In some municipalities, a finite and sometimes large quantity of yard waste can be collected during spring and early summer (in some wet years; and in areas where there is no lawn and garden watering prohibition). Likewise, there is an annual leaf drop and collection in the fall in areas of municipalities where there are mature trees (not in new sub-divisions or on the grounds of many apartment complexes).

Approximately 1,100 tonnes of leaves were collected by the Borough of East York, which works out to an average of 0.01 kg of leaves/cap/day---or 0.02 lbs/person/day. For municipal waste management purposes, the amortization of the tonnage of leaves and yard waste over the entire year, in order to calculate a daily per capita generation rate is very misleading. Leaves and yard waste are not generated by residents on this kind of basis. Likewise, it is equally misleading to record leaves and yard wastes as some annual percentage of an overall waste stream. A hypothetical centralized composting facility that was sized for a daily feed rate of leaves would be grossly undersized. In fact, the entire annual tonnage of leaves may be expected to arrive over a period of approximately 3-4 weeks. The latter arrival rate of leaves will be an important factor in formulating alternative waste management plans for their disposal. A similar argument may be made with respect to the seasonal generation of yard wastes.

In summary, residential waste generation is the result of human activities; the "necessities--and some luxuries--of life". The "residues" that remain after a single day of living can be categorized and quantified. Essential waste management practices---current and planned---require quantitative information

about the specific types of residues whose production is properly documented over "real" generation periods, i.e., day, week or month. Percentage composition <u>adds</u> nothing useful to this basic quantitative information; rather, it is a mathematical manipulation of the data that ultimately requires an explanation. Waste composition data presented in a percentage format are only useful when the physical quantity, e.g., per capita generation rate, tonnages etc., of at least one component of the waste stream is also indicated.

4.6 The Blue Box: A Waste Management Option That Presents Problems In Waste Composition Data Handling

The presence of the Blue Box "option" for setting out certain recyclable portions of residentially generated refuse at the curb has presented some significant problems for this study in two areas: 1) the general calculation of per capita generation rates for sectors of municipal populations which have a Blue Box program; 2) the estimation of the efficiency of Blue Box programs to "capture" those recyclables that are part of a municipal program and 3) the general residential waste sampling problems encountered in apartment buildings (discussed above in Section 4.3).

As noted in Section 2.2.4.2, a number of municipal recycling coordinators were interviewed in order to determine a reasonable estimate of the frequency with which residents of detached dwellings put out their Blue Boxes. While many sources of variations in frequency were noted, an overall impression was that a bi-weekly set-out frequency was not unreasonable as an average estimate. Given this assumption, how were the weights of the Blue Box materials to be calculated into the estimated average per capita generation rates and waste composition? We have reasoned that a conservative estimate is preferred and have therefore divided the weights of the Blue Box items by 2. This calculation attempts to account for the randomness of Blue Box set-out by any individual and tries to provide an allowance for an "error factor", necessitated by the small sample of residents. That is, the Study Team typically collected bagged refuse

from 7-10 dwellings with Blue Boxes coming from a varied proportion of these dwellings. If our sample population were on the order of 100 or more dwellings, then, given an average bi-weekly set-out frequency, one would anticipate that approximately 50% of the dwellings would have placed there Blue Boxes at the curb each week. Therefore the weekly quantity of Blue Box materials, set out by 50% of the population, would be a reasonable estimate of the weekly generation rate by the entire 100 or more dwellings. In the case of our small samples, we felt it was better to err on the low, or conservative side, and divide the weight by two.

4.7 Random Sampling—When To Exclude Large Objects From the Sample Collection

The statistical concept of "optimum allocation in cluster analysis" is relevant to the practical problem which field crews face in a sampling program like ours. For example, an old oil burner unit was set out at curbside, along with bagged waste. The question arose as to whether to include this item as part of our 100 kg sample or whether to record the weight of this item and treat it separately, like yard waste.

The answer is based on empirical experience with respect to the standard deviation of the expected average weight (or percent composition) of the metal fraction in the residential waste stream. We know from literature reports that metal is a relatively minor component in household garbage; the average weight of metal would also have an associated standard deviation. Discarded oil burners are not a commonly encountered component in residential curbside waste and its weight does not fall within the standard deviation of the average weights of metal that have been historically encountered.

Because we are only collecting 100 kg quantities (approximately) of curbside waste, inclusion of the oil burner weight would have the secondary effect of reducing the relative (proportional) weight of other components that we would

collect to achieve the 100 kg total. (NOTE: this is similar to the problem encountered with large quantities of newsprint in the apartment building EAs in the Borough of East York where there are no Blue Box programs and also relates to the discussion of yard wastes.) Calculation of the percent composition for this sample would reveal a skew toward lower than average values for items normally encountered at a higher percent in the residential waste stream.

The optimal allocation for sample weights within clusters (ref. 19) is as follows:

$$\frac{n_1}{N_1 s_1} = \frac{n_2}{N_2 s_2} = \ldots = \frac{n_k}{N_k s_k}$$

Where n_k = sample weight of waste component (cluster)
s_k = expected population standard deviation
N_k = total weight of waste component available for sampling (cluster)

The inclusion of a large oil burner causes the fraction for miscellaneous metal to upset the optimal allocation function. The only solutions to this problem are to increase the sum of $[N_1 \ldots N_k]$ (i.e. total sample weight), or to omit the large item, a priori, from the sample.

4.8 Determining the Number of Samples to Collect

4.8.1 The Original Klee & Carruth (1970) Working Definition of "Organics": Perpetuation of Half the Story Can be Misleading

For the record, it is important to note that certain details in the important work of Klee & Carruth (ref. 25) came to light in the later report of Woodyard & Klee (ref. 48). The latter paper came to our attention after our Study was well underway and shows a graph depicting the range of numbers of 200 - 300 lb.(90-136 kg.) samples that must be analyzed with respect to the relative

composition of particular constituents in the waste stream. Graphs of these relationships have appeared in the published literature (ref. 47, Figure 1-6; Figure 1 herein) and in an unpublished manuscript, courtesy of Mr. A. Geswein, U.S.E.P.A. (pers. commun.).

More important is the terminology that was employed by Woodyard and Klee (ref. 48) in the classification of the components in the waste stream. The following five categories were used:

organics	(wet garbage, yard waste, mixed paper, plastic and rubber);
metal	(ferrous, aluminum and/or other nonferrous);
glass	(mixed or colour sorted);
newsprint	
corrugated	

Of interest is the wide variety of items under the category of "organics". While Klee and coworkers were chemically correct in their assignments to this category, the present "conventions" generally separate these items into individual categories (perhaps with the exclusion of wet garbage and yard wastes which are frequently combined; see Table 1, herein). By combining as many materials as they did under the heading of "organics" the relative weight of this fraction of the waste stream was greatly increased, vis-à-vis a conservative definition that restricts "organics" to just kitchen or food wastes. The implications for the original Woodyard & Klee category is that fewer 200 - 300 lb.(90-136 kg.) samples were needed in order to achieve a precision of ± 10%, than presently would be needed for an "organic" category with only food wastes in it, as in our Study. The broader definition of organics used by Klee and coworkers would have application if waste composition information was to be evaluated with respect to the incineration of waste streams.

At the outset of the Study, we were unaware of the Woodyard and Klee paper and <u>assumed</u>--incorrectly--that the term organics, shown on the graphs noted

above was restricted to the more conventional usage of present day. Hence, our curb-side sampling plan called for 9 - 10 samples of 90 - 136 kg each in order to give a precision with respect to the organic fraction (by our definition) of ± 10%.

Estimated Percent Composition: Kitchen Waste

The number of samples taken in the study for the purposes of estimating percent composition of household waste was based on the results reported by Klee & Carruth (ref. 25). It is possible, however, to determine the number of samples required to estimate the percent composition of waste within a stated confidence level for the population under study. These calculations are carried out in exactly the same manner as the calculations to estimate the required sample size for the estimation of per capita generation rate (see section 4.8.2 below).

Using the Borough of East York as an example, the following calculation can be made to determine the number of EAs that must be sampled to achieve the desired estimate of the percent composition of kitchen waste. In this case, percent composition will be estimated at a precision of ± 15%, with a 90% probability (confidence level).

The following statistical relationships apply:

$$n = (ts/d)^2$$

where:

- n = number of required samples
- t = t-value at the required confidence level, with appropriate degrees of freedom
- s = estimation of the population standard deviation
- d = precision requirement for the estimate of the population parameter

For example in East York the following calculation can be made:

$\bar{x}$ = 24.0% (% food waste) (unweighted mean)
s = 5.194 (unweighted standard deviation)

alpha = 0.1 (for 90% confidence level)
alpha/2 = 0.05 (two-tail test of confidence)
degrees of freedom = (n-1) = 6
t-value = 1.943

$n = ((1.943 \times 5.194) / (24.4 \times 0.1))^2$
$n = 17.7$

The t-value at n = 18, (t = 1.740, d.f. = 17), is less than n = 7 (t = 1.943), therefore, a better approximation of the required sample size can be calculated.

By reiteration of the above steps for n = 18, and n = 14, the new approximation of the required sample size is n = 14.7. A final calculation finds:

n = 15
t = 1.761
d.f. = 14

$n = ((1.761 \times 5.194) / (24.0 \times 0.1))^2$
$n = 14.5$

confirming the approximation.

In the case of the Borough of East York, 8 additional EAs would be required for sampling to achieve the accuracy desired for the food waste component. These EAs could be selected randomly from the list of all possible EAs, or they could be apportioned over all the matrix cells.

In the Town of Fergus, the number of EAs required for sampling to achieve the stated accuracy is only 5 (calculations not shown). This indicates that the number of samples actually taken (6) was more than enough to achieve an estimate at the stated accuracy. No calculations were attempted for the City of North Bay due to the limited nature of the data.

4.8.2 Determining the Appropriate Number of EAs to Sample For the Accuracy of Percentage Waste Generation Rates Required

The following points may be noted about the method:

1. Each EA selected for study was chosen at random by Decima Research, based on Statistics Canada information, as described in Section 2.2.1. In the case of the Borough of East York, if the EA turned out to have too small a population for us to sample, Decima rejected the EA and randomly chose another. If the EA turned out to present sampling problems because the dwellings were mostly located over store-fronts, we reported this to Decima and they randomly chose a replacement. As noted earlier in the report, waste generated in apartment units over stores was co-mingled with waste from the stores. These locations are not easily included in a residential waste sampling program.

2. In the Borough of East York, where there was such a large number of EAs in each income/dwelling matrix cell, it would have been desirable to sample more than one EA per cell---time, manpower and budget permitting. Using the standard deviation of the average per capita generation rates computed for all 7 EAs, we can calculate the number of EAs that we may theoretically wish to sample in the Borough of East York if we wanted to obtain an accuracy of ± 10% with a 90% confidence level for the estimate of the average per capita generation rate.

The following relationships apply:

$$n = (ts/d)^2$$

where:

- n = number of required samples
- t = t-value at required confidence level, with appropriate degrees of freedom
- s = estimate of the population standard deviation
- d = precision requirement for estimate of population parameter

From our sample of 7 EAs, the following results were obtained:

$\bar{x}$ = 1.039 (kg/cap/day) (unweighted sample mean)
s = 0.188 (unweighted standard deviation)

alpha = 0.1 (for 90% confidence level)
alpha/2 = 0.05 (two-tail test of confidence)
degrees of freedom = (n-1) = 6
t-value = 1.943

$$n = ((1.943 \times 0.188) / (1.03 \times 0.1))^2$$
$$n = 12.6$$

The t-value at n = 13 (t = 1.782; d.f. = 12) is much less than at n = 7 (t = 1.943), therefore a better approximation of the required sample size can be calculated.

By reiteration of the above steps for n = 13, the new approximation of the required sample size is n = 11. A final calculation finds:

n = 11
t = 1.812
d.f. = 10

$$n = ((1.812 \times 0.188) / (1.03 \times 0.1))^2$$
$$n = 10.9$$

confirming the approximation.

In the Borough of East York, only 3 additional EAs would be required to achieve the accuracy sought. These EAs could be randomly selected from the list of all possible EAs, or they could be selected from the matrix cells with the largest number of EAs.

In the Town of Fergus, the number of EAs required for sampling to achieve the stated accuracy is 17 (calculations not shown). This large number poses a problem as there are not 17 EAs in Fergus. One suggestion would be to resample EAs at regular intervals until the required number of EAs have been sampled.

No calculations were attempted for North Bay due to the limited nature of the data.

4.9 White Goods: General Comments On Generation Rates Reported

Generation rates for both white goods and non-metal bulk items varies substantially from community to community and from year to year. This can be attributed to a variety of reasons, several of which were identified in our discussions with the community officials. Notable causes for differences are:

1. Type of collection service. Some communities collect white goods and bulk items year round, while other communities have only a spring/fall bulk collection.

2. Commitment to recycling. Communities promoting recycling of white goods for scrap metal (e.g. Toronto) reported increases in tonnages collected as the recycling program became more established.

3. Definition of a "bulky" item requiring special collection. Depending on the municipal waste collection policy, some items that are treated as bulk or special pick-up items in one community may be collected with regular curbside waste in communities that have a "take all" collection policy.

SECTION 5

CONCLUSIONS AND RECOMMENDATIONS

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 General

The Study methodology may be used by individual municipalities wishing to assess their own residential waste streams. It may be helpful for a municipality to retain professional expertise to assist in the assessment of the Statistics Canada information on income, dwelling type and any other socio-economic parameters that the municipality has the time and budget to incorporate into their residential waste sampling program. The actual collection and sorting of residential waste can be carried out by municipal employees who have received the proper instruction on waste classification and other field techniques.

5.2 Conclusions

The results of the residential waste study presented herein lead to the following conclusions.

1) Municipalities in Ontario are implementing a number of waste diversion options for residents -- notably, Blue Box and backyard composting -- as the waste management strategies of municipalities continue to change. As the number of waste diversion options increase, the chances of obtaining an accurate baseline of waste generation data decreases. Where there was formerly a single waste stream coming from residences on a predictable and scheduled basis, now there may be two or more curbside waste streams, and possibly a another stream directed to a backyard composter. Therefore, there is more potential for error in waste composition studies conducted in municipalities that are aggressively pursuing waste diversion programs (e.g. Fergus and East York) than in those that have yet to implement such programs --- and where there is still a single residential waste stream.

2) Given an understanding of the reality of residential waste stream partitioning noted above, the residential waste assessment procedures for detached dwellings included an estimated allocation for Blue Box materials. Waste assessment of residential populations residing in multi-unit dwellings (apartments) presented additional challenges in data collection. Per capita waste generation rates were obtained for both residential groups; however, a need for improvement in sampling procedures was identified for large apartment buildings (East York) where refuse was compacted.

3) The per capita waste generation rates (excluding yard wastes and bulky items) for the three municipalities appeared to vary with population: Fergus 0.80 kg/capita/day; North Bay 0.93 kg/capita/day; East York 0.99 kg/capita/day. However, municipal population is probably only a superficial correlate and not causally related to the waste generation process. For example, the weight (kg) of the newspapers collected in East York, versus Fergus, may partially explain the higher per capita generation rate (kg/person/day) in East York (Table 14). Some of the difference may also be attributed to seasonal factors.

4) The method used in the Study has revealed apparent differences in the per capita waste generation rates within income groups. More waste (excluding yard waste and bulky waste) appears to be generated by residents of detached dwellings than by apartment dwellers (Table 22). However, no easily discernable pattern could be detected in the per capita generation rates between different income groups. More detailed sampling in each municipality would be needed to determine any potential income effects on waste generation characteristics.

5) It is interesting to note that there is very little difference in average per capita generation rates of kitchen waste for Fergus, North Bay and East York. The respective values are: 0.23, 0.24 and 0.25 kg/capita day (Table 22).

When the kitchen waste fractions were computed as a percent of the total

composition of the residential waste stream, Fergus showed a higher percentage than East York and North Bay: Fergus 28.8 % versus, East York 25.5 % and North Bay 26.0 %. Again, larger quantities of other components in the East York and North Bay residential waste streams (e.g. newspapers) may explain the lower percentage (or relative proportion) of kitchen waste in the refuse.

6) Reliance on "waste composition percent" as the sole means of characterizing waste can be misleading and create more questions than are actually answered. The per capita generation rates of the total waste stream and its components are more important for planners of municipal waste management programs.

7) The study demonstrates a cost effective residential waste assessment method that uses readily available equipment and that can be implemented by municipal staff.

5.3 RECOMMENDATIONS

Municipalities conducting waste composition study might consider the following recommendations when designing the sampling protocol and implementing the study methodology.

1) For sampling and sorting convenience, municipalities may choose to conduct the waste composition studies in late spring or mid fall when refuse odours are less intense and maggots are less frequently encountered. According to Vesilind & Rimer (ref. 47), the average residential waste composition does not vary by more than ± 10% over three quarters of the year. Therefore, aesthetics of the working conditions can be taken into account without risk of obtaining skewed data. The inclusion of yard waste in overall residential waste composition percent profiles should be avoided so that baseline composition

percentages are not misrepresented.

2) Municipalities may choose to set up independent collection systems to study the seasonal generation of yard waste and leaves. This would require a coordinated effort between garbage collection personnel, private horticultural firms and other agencies generating/and collecting these waste streams.

3) In order to avoid the sampling problems that we encountered with the large apartment buildings in East York, where apparent sampling biases were difficult to avoid, arrangements could be made, for example, with 30 units within the building to participate in a refuse study. This would give a more accurate appraisal of the waste composition in these large apartment buildings. As a check, the method described herein for obtaining the per capita generation rate for the entire building could then be compared with the per capita generation rate for the 30 units.

4) Municipalities in Ontario should follow the waste composition procedure in conducting their own waste composition analysis, for reasons of consistent data generation using a cost effective approach. Periodically, municipalities should conduct additional waste composition studies to monitor trends in residential waste management and the effectiveness of waste management programs.

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ACKNOWLEDGEMENTS

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Town of Fergus:

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Mr. Robert Ferguson, Commissioner of Works, Metro Toronto, gave permission to use the laboratory in the former Ontario Centre for Resource Recovery (OCRR) for the moisture analyses. Mr. Brad Guglietti, Waste Management Branch, MOE, arranged for the loan of a Sartorious balance for this work.

Borough of East York:

The transition of the year from fall to winter saw three new faces; the Study team was: Jasmine Essue (from Fergus), Rob Flindall, Gord McLaren and Cria Pettingill. They were steadfast and dedicated to fine tuning the procedures that were initiated by the Fergus crew.

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Mr. Robert Ferguson, Commissioner of Works, Metro Toronto, gave us permission to sort the East York refuse on the tipping floor of the Commissioners Street Incinerator and to continue using the OCRR for the moisture analyses.

A & M Disposal and Industrial Disposal provided important refuse collection services in this phase of the Study.

City of North Bay:

Rob Flindall, Gord MacLaren and Dean Wilde (City employee) braved the elements to continue the refuse collecting and sorting in this last phase of the residential Study.

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APPENDIX A

TOWN OF FERGUS

APPENDIX A1

CALCULATION OF PER CAPITA WASTE GENERATION RATES FOR STUDY EAs

Town: Fergus
EA: 256 medium income: primarily mixed dwellings
Pop: 755
Dwellings: 300
PPD: 2.52

Sample Number	Dwellings with Refuse	Dwellings with Blue Boxes	Sampled Refuse Weight (kg)	Sampled Blue Box Weight (kg)	Daily Weight /Dwelling (kg/day)	Waste /person /day (kg)	S.E.
21	8	5	118.28	39.03	2.67	1.059	
22	7	1	103.84	0.80	2.18	0.864	
23	10	6	98.25	17.27	1.61	0.639	
24	11	8	100.78	78.63	2.01	0.798	
25	8	5	103.12	15.30	2.06	0.817	
26	8	4	89.22	8.90	1.75	0.695	
27	8	4	82.43	17.67	1.79	0.709	
28	11	6	104.20	28.40	1.69	0.671	
29	10	8	74.14	36.20	1.38	0.549	
30	6	5	101.34	24.10	2.76	1.094	
Sample Avg.	8.7	5.2	97.56	26.63	1.99	0.79	0.056

Town: Fergus
EA: 258 high income: primarily single detached
Pop: 600
Dwellings: 205
PPD: 2.93

Sample Number	Dwellings with Refuse	Dwellings with Blue Boxes	Sampled Refuse Weight (kg)	Sampled Blue Box Weight (kg)	Daily Weight /Dwelling (kg/day)	Waste /person /day (kg)	S.E.
31	8	5	115.80	31.11	2.51	0.857	
32	11	5	96.39	26.38	1.63	0.556	
33	6	3	123.52	24.30	3.52	1.201	
34	8	7	96.82	39.50	2.13	0.728	
35	12	8	103.06	45.80	1.64	0.558	
36	9	7	113.69	37.20	2.18	0.745	
37	2	2	42.12	40.36	4.45	1.519	
38	5	5	89.83	15.58	2.79	0.952	
39	7	4	122.68	12.65	2.73	0.932	
40	11	6	141.71	22.39	2.11	0.719	
Sample Avg.	7.9	5.2	104.56	29.53	2.57	0.88	0.094

Town: Fergus
EA: 257 medium income: primarily multiple dwellings
Pop: 685
Detached: 50
Other: 240
PPD: 2.36

Sample Number	Dwellings with Refuse	Dwellings with Blue Boxes	Sampled Refuse Weight (kg)	Sampled Blue Box Weight (kg)	Daily Weight /Dwelling (kg/day)	Waste /person /day (kg)	S.E.
41	9	4	102.36	10.32	1.81	0.767	
42	9	8	102.58	44.60	2.03	0.859	
43	9	10	100.48	40.10	1.88	0.797	
46	36	0	177.00	0.00	0.98	0.417	
47	36	0	133.00	0.00	0.74	0.313	
50	36	0	240.60	0.00	1.34	0.566	
44/45	36	0	261.80	0.00	1.45	0.616	
48/49	36	0	204.00	0.00	1.13	0.480	
Detached Avg.	9.0	7.3	101.8	31.7	1.9		
Other Avg.	36.0	0	203.28	0.00	1.13	0.60	0.069

Detached Samples 41-43
Other Dwellings: Samples 44-50
***Total weight of waste found in apartment dumpsters used in column 4**
***5 day collection period for apartments in Samples 44-50**
***No Blue Box collection for apartments in Fergus**

Town: Fergus
EA: 260 low income: primarily multiple dwellings
Pop: 600
Detached: 70
Other: 195
PPD: 2.26

Sample Number	Dwellings with Refuse	Dwellings with Blue Boxes	Sampled Refuse Weight (kg)	Sampled Blue Box Weight (kg)	Daily Weight /Dwelling (kg/day)	Waste /person /day (kg)	S.E.
51	2	2	120.14	7.63	8.85	3.918	
52	7	4	101.35	7.12	2.20	0.971	
53	10	3	89.34	28.09	1.95	0.861	
54	8	6	85.08	22.80	1.79	0.792	
55	11	11	95.29	36.30	1.47	0.652	
56	7	5	94.41	34.20	2.42	1.069	
57/58	64	0	249.42	0.00	0.78	0.345	
Detached Avg.	7.5	5.2	97.60	22.69	3.11		
Other Avg.	64	0	249.42	0.00	0.78	1.23	0.500

Detached Samples 51-56
Other Dwellings: Samples 57-58
***5 day collection period for apartments in Samples 44-50**
***No Blue Box collection for apartments in Fergus**

APPENDIX A2

WASTE COMPOSITION DATA

Town: Fergus
EA: 263 medium income: primarily mixed dwellings
Pop: 995
Dwellings: 320
PPD: 2.98

Sample Number	Dwellings with Refuse	Dwellings with Blue Boxes	Sampled Refuse Weight (kg)	Sampled Blue Box Weight (kg)	Daily Weight /Dwelling (kg/day)	Waste /person /day (kg)	S.E.
1	7	6	83.69	23.78	1.99	0.668	
2	4	3	94.14	17.94	3.79	1.272	
3	9	5	100.63	21.80	1.91	0.640	
4	7	5	98.03	14.70	2.21	0.742	
5	10	2	65.90	7.63	1.21	0.407	
6	6	3	100.31	14.50	2.73	0.917	
7	8	2	98.46	7.42	2.02	0.679	
8	6	2	121.29	5.79	3.09	1.038	
9	6	3	100.80	6.83	2.56	0.860	
Sample Avg.	7	3.4	95.92	13.38	2.39	0.80	0.084

*Sample 5 contained a large amount of yard waste mixed with household waste.

Town: Fergus
EA: 262 medium income: primarily single detached
Pop: 815
Dwellings: 300
PPD: 2.72

Sample Number	Dwellings with Refuse	Dwellings with Blue Boxes	Sampled Refuse Weight (kg)	Sampled Blue Box Weight (kg)	Daily Weight /Dwelling (kg/day)	Waste /person /day (kg)	S.E.
10	8	2	94.38	8.20	1.98	0.727	
11	5	2	133.53	6.50	4.05	1.488	
12	8	2	104.53	8.36	2.16	0.796	
13	7	7	121.30	34.50	2.83	1.040	
14	7	2	82.14	9.56	2.02	0.742	
15	11	7	104.26	48.60	1.85	0.680	
16	8	3	107.01	7.60	2.09	0.769	
17	9	6	97.87	22.30	1.82	0.669	
18	8	5	99.05	25.20	2.13	0.783	
19	5	2	106.38	7.70	3.31	1.219	
Sample Avg.	7.6	3.8	105.05	17.85	2.42	0.89	0.086

TABLE 16: MOISTURE CONTENT OF SOME COMBUSTIBLE MATERIALS IN EAST YORK AND FERGUS RESIDENTIAL WASTE

	% Moisture															
	PAPER								PLASTIC							
Sample Number	News-print	Fine Paper	Maga-zines (Fliers)	Mixed Paper	Box Board	Kraft	OCC	Tissues	Poly-olefin	Poly-styrene	Mixed Blend	Coated	Food Waste	Wood	Diapers	Textiles
East York																
118	24.6	22.5	11.4	21.2	25.2	17.9	11.0	44.3	19.6	20.2	18.6	11.1	75.5	9.9		
125	21.2		17.1	27.6	31.4	28.6	13.1	39.1	15.4	12.6	33.2	3.9	66.3		71.3	15.6
134	34.6	20.4	16.3	19.8	25.9	38.1	15.6	46.0	18.6	19.4	34.7	6.2	68.0		71.4	41.3
	15.0	19.0	13.0	18.6	30.1	14.3	10.1	43.5	20.2	5.9	31.9	10.1	62.6			11.1
149	8.8	15.0	6.8	11.7	17.9	25.3	10.0	32.3	31.4	7.1	23.1	13.2	66.2		52.6	18.4
	7.9	9.3	5.5	18.6	16.3	23.3	9.4	40.6	13.8	9.5	32.5	1.5	51.4		61.7	12.1
159	24.2	12.4	8.3	13.0	21.4	15.6	11.5	41.6	8.8	8.1	29.3		55.4		44.4	20.2
Fergus																
55		28.4	18.0		24.3	25.3		41.5	27.0	18.1	27.5		71.9			
						21.5			21.4				61.7			
													71.7			
58		15.0	14.3		19.9	23.3		33.4	34.9	1.9	14.3		66.0		63.7	
			19.8		17.1			49.7	27.4				66.0			
			12.9						16.3				68.9			
Average	19.5	17.8	13.0	18.6	23.0	23.3	11.5	41.2	23.2	11.4	27.2	7.7	65.5	9.9	60.8	19.8

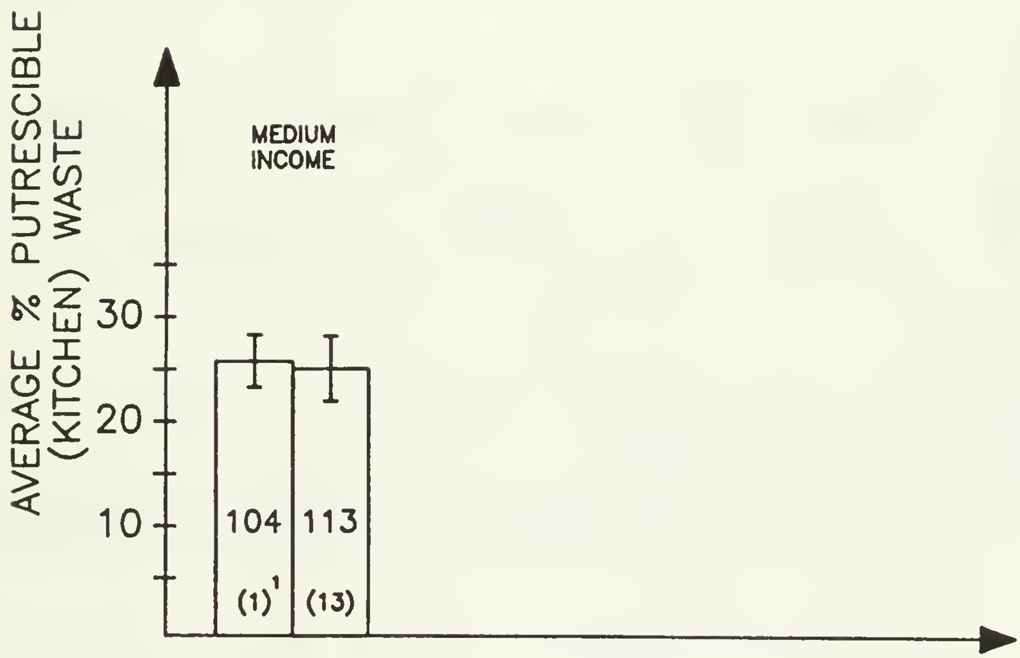
TABLE 15: SUMMARY OF WASTE GENERATION CHARACTERISTICS OF 7 SCHOOLS IN THE BOROUGH OF EAST YORK

School Category	School Name	Number of Students and staff	Weekly weight (kg)	Per capita Generation (kg/cap/day)[1]	% Composition	
					Putrescible	Total paper
Primary[2]						
1	Diefenbaker	230	198.87	0.173	30.95	51.6
3	Selwyn	224	152.93	0.136	35.35	52.5
5	George Webster	393	201.15	0.102	36.46	41.2
6	Crescent Town	351	147.83	0.084	33.05	51.2
Junior High School						
2	Cosburn	414	338.61	0.164	44.21	44.0
4	George Brown	339	361.12	0.213	30.91	51.1
Senior High School						
7	Leaside	1180	954.20	0.162	19.64	64.8

1 5 day week

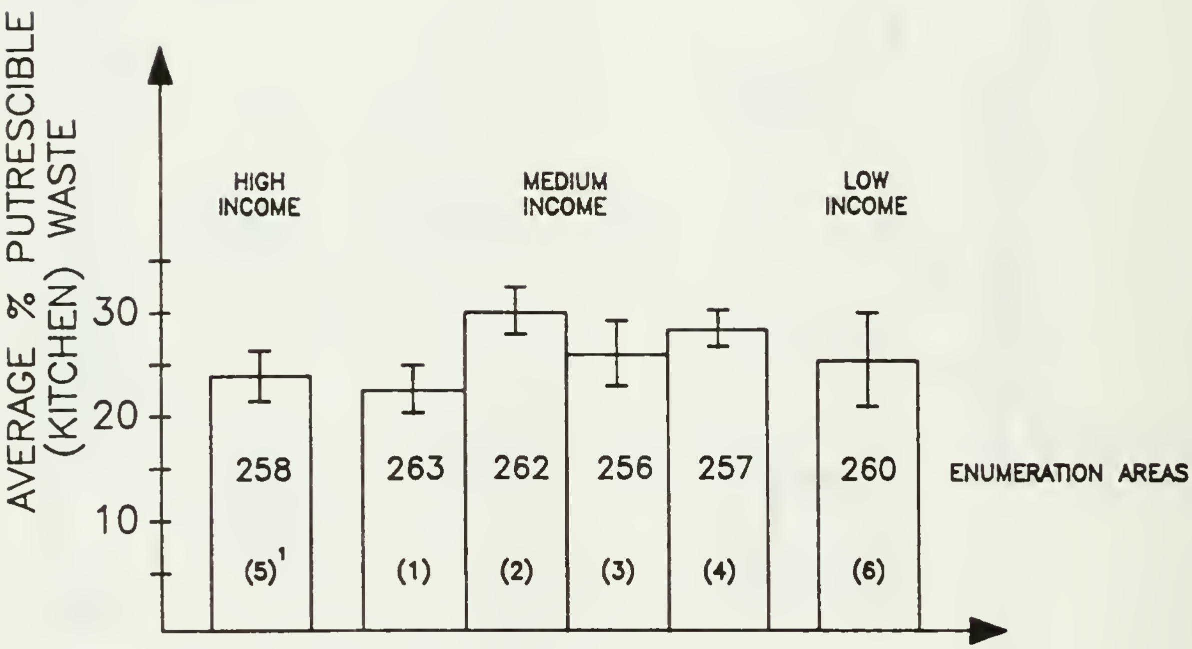
2 numbers refer to columns of data in Appendix C

FIGURE 15: BAR GRAPH COMPARING THE PERCENTAGE FOOD WASTE GENERATED IN THE EAS IN THE CITY OF NORTH BAY.



1 — Consecutive weeks in study

FIGURE 14: BAR GRAPH COMPARING THE PERCENTAGE FOOD WASTE GENERATED IN THE EAS IN THE TOWN OF FERGUS.



1 – Consecutive weeks in study

3.3 Christmas Collection

The residential refuse from a middle income/detached dwelling from the Borough of East York (EA 90-117) was sampled during Christmas week. The data are shown in Appendix C. As Blue Boxes were not set out on the day of the Christmas collection, the quantities of these materials, generated along with the other refuse, are not known. On a per capita basis the amount of food wastes and boxboard was greater during this period than during the period of, 28-30 November, when the EA was sampled as part of the Borough of East York baseline study. When Blue Box materials are removed from the percent waste composition calculations of the November data for the same EA, the Standard Errors for the November and Christmas food waste data come close to overlapping but in fact, do not.

3.4 Schools in East York: Per Capita Generation Rates and Waste Composition

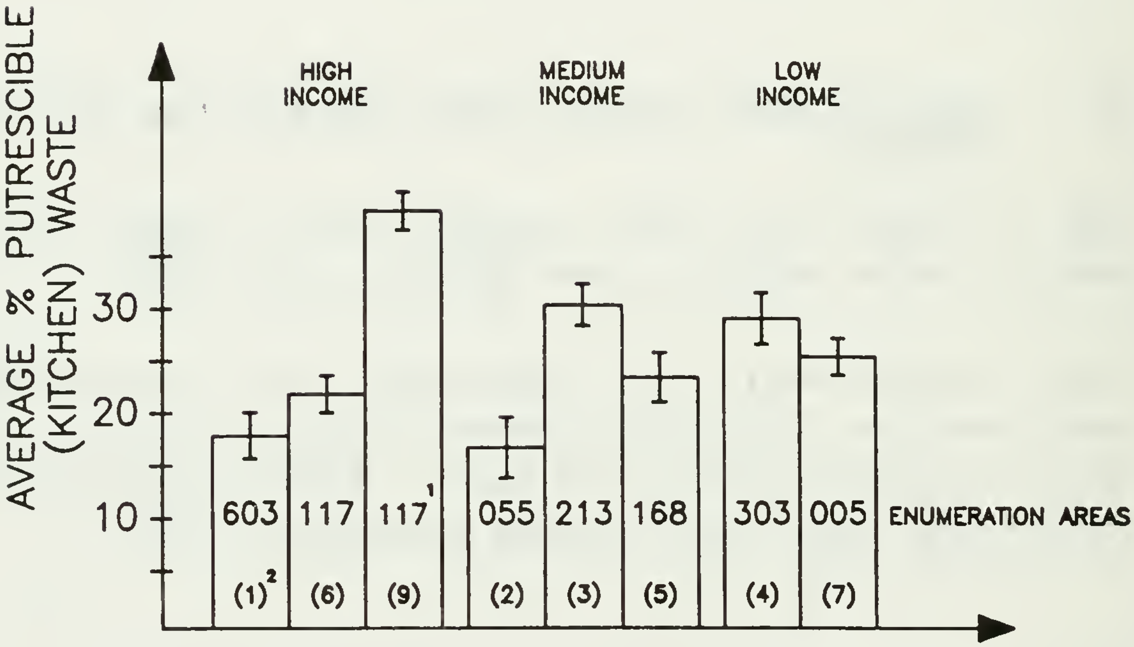
Table 15 compares the per capita generation rates of 4 primary schools, 2 junior high schools and a single senior high school in East York.

Waste composition data are given in Appendix C2. Table 15 shows that food waste ranges from 19.6% to 44.2%, with an average of 32.9%. Waste paper (total of all categories) was the greatest fraction of the waste stream and ranged from 41.2% to 64.8% of total waste, with an average of 51%.

3.5 Moisture Content

Table 16 shows the moisture content of combustible materials in the residential waste from both the Borough of East York and the Town of Fergus.

FIGURE 16: BAR GRAPH COMPARING THE PERCENTAGE FOOD WASTE GENERATED IN THE EAS IN THE BOROUGH OF EAST YORK.



1 — Christmas Collection

2 — Consecutive weeks in study

TABLE 17: CONCENTRATION OF HEAVY METALS (UG/G) IN EXTRACTS PREPARED FROM THE CONTENTS OF VACUUM CLEANER BAGS RECOVERED FROM RESIDENTIAL WASTE IN FERGUS

	Sample Number					
Metal	2	26	28	31	33	55
Alumimum	15500	3390	15900	6480	12100	12200
Arsenic	1.9	5.2	5.7	6.4	1.7	11.4
Barium	250	44	260	170	120	260
Beryllium	1	<1	2	<1	<1	1
Boron	11	24	23	9	7	5
Cadmium	460	2	39	3	<2	2
Calcium	30400	8770	42400	23500	39700	24800
Chromium	66	24	110	43	27	41
Cobalt	9	4	10	5	4	3
Copper	77	28	160	53	59	99
Iron	9200	1900	9600	4400	6100	8200
Lead	160	<10	120	56	49	120
Lithium	3	<1	7	<1	<1	1
Magnesium	10600	2400	18200	7900	15700	8700
Manganese	200	71	310	130	210	200
Mercury	0.588	0.339	1.69	0.913	0.434	2.28
Molybdenum	3	<1	3	3	<1	3
Nickel	54	11	56	32	17	29
Phosphorus	2100	420	1300	600	640	1100
Potassium	8690	2120	8970	4620	5930	4720
Silver	4	2	7	5	3	6
Sodium	2090	4650	1220	29400	1260	42800
Strontium	120	29	130	59	85	130
Scandium	<10	<10	<10	<10	<10	<10
Tin	50	30	50	30	30	20
Titanium	2100	460	3300	710	1100	990
Tungsten	<10	30	26	15	20	30
Vanadium	14	4	10	4	9	22
Yttrium	5	1	6	2	5	5
Zinc	570	240	530	280	330	310
Zirconium	77	24	160	58	52	51

3.6 Metal Analyses On Vacuum Cleaner Bag Contents: Town of Fergus and Borough of East York

Tables 17 and 18 gives the metal analyses conducted on the contents of vacuum cleaner bags recovered from residential waste in the Town of Fergus and the Borough of East York.

3.7 BTU Values for Mixed Plastics and Disposable Diapers

Table 19 gives BTU values for 3 kinds of mixed plastic packaging: rigid and flexible wrap as well as a new (unused) disposable diaper. These data supplement the BTU information from Vesilind & Rimer (ref. 47) and Edgecombe (pers. commun.) presented in Appendix E of this report.

3.8 Yard Wastes

3.8.1 Town of Fergus

Yard waste was always collected when it was placed out with the other waste. It was weighed as a separate component of the waste stream. The raw data for yard waste are found in Appendix A2. As noted above, yard waste was not supposed to be placed at the curb for municipal collection in the Town of Fergus.

3.8.2 City of North Bay

The North Bay waste analysis was conducted during the month of February, so very little yard waste was expected to be found. However, several bags of yard waste, weighing 23.5 kg, were found in sample 203 for EA 104. No other samples contained yard waste.

Ministry of the Environment
Waste Composition Study

GORE & STORRIE LIMITED

Town: FERGUS
Enumeration Area: 256 medium income; primarily mixed dwellings
n = 10

SAMPLE #	1 kg	1 % wt	2 kg	2 % wt	3 kg	3 % wt	4 kg	4 % wt	5 kg	5 % wt
(1) Paper (a) Newsprint	3.900	2.42%	7.000	7.38%	1.000	1.51%	7.600	3.43%	7.100	8.44%
(b) Fine Paper / CPO / Ledger	1.000	0.73%	1.900	1.55%	1.300	1.22%	1.900	1.08%	0.000	0.63%
(c) Magazines / Flyers	36.600	26.06%	3.700	3.30%	2.900	2.26%			8.200	7.64%
(d) Waxed / Plastic / Mixed	1.600	1.17%	1.800	1.75%	2.610	2.46%	0.000	0.43%	2.200	2.00%
(e) Boxboard	4.000	2.43%	4.700	4.57%	4.550	4.30%	6.200	3.85%	3.700	3.17%
(f) Kraft	2.900	2.05%	0.900	0.78%	1.600	1.33%	4.900	3.07%	1.000	0.91%
(g) Wallpaper										
(h) OCC	6.900	2.04%	11.700	11.37%	0.800	0.57%	1.900	1.08%	2.010	1.85%
(i) Tissues	2.000	2.12%	2.700	2.63%	6.260	3.90%	7.000	3.43%	4.400	3.30%
(2) Glass (a) Beer (i) refillable									0.252	0.23%
(ii) non-refillable										
(b) Liquor & Wine Containers	1.500	1.10%	0.266	0.26%	0.423	0.40%			1.700	1.54%
(c) Food Containers	2.900	1.78%	12.000	11.66%	2.300	2.33%	2.200	1.57%	1.700	1.34%
(d) SoftDrink (i) refillable	2.500	1.85%								
(ii) non-refillable			3.400	3.30%	3.000	2.83%				
(e) Other Containers							0.112	0.08%	0.216	0.20%
(f) Plate										
(g) Other	0.020	0.01%	0.771	0.75%			0.088	0.06%	0.063	0.00%
(3) Ferrous (a) Soft Drink Containers	0.094	0.07%	0.600	0.58%	0.001	0.00%	0.031	0.02%	0.200	0.18%
(b) Food Containers	3.300	2.63%	1.600	1.55%	1.800	1.70%	2.100	1.30%	3.900	3.08%
(c) Beer Cans (i) returnable										
(ii) non-returnable										
(d) Aerosol Cans	0.900	0.68%	0.188	0.18%	0.043	0.61%	0.903	0.22%	0.438	0.40%
(e) Other	0.000	0.44%	1.900	1.85%	0.603	0.57%				
(4) Non-Ferrous (a) Beer Cans (i) returnable	0.100	0.08%			0.220	0.21%	0.018	0.01%	0.300	0.27%
(ii) non-returnable			0.100	0.10%						
(iii) American										
(b) Soft Drink Containers	0.047	0.08%	0.900	0.59%	0.100	0.09%	0.100	0.07%	0.093	0.09%
(c) Other Packaging										
(d) Aluminum	2.000	1.47%	0.230	0.22%	0.200	0.19%	0.800	0.18%	0.800	0.73%
(e) Other	0.047	0.03%								
(5) Plastics (a) Polyolefins	3.900	3.86%	8.000	7.77%	6.504	6.10%	7.611	3.55%	6.300	3.08%
(b) PVC	0.080	0.04%	0.089	0.09%			0.086	0.06%	0.150	0.16%
(c) Polystyrene	0.700	0.51%	0.000	0.58%	0.008	0.57%	0.200	0.30%	0.500	0.43%
(d) ABS										
(e) PET							0.058	0.04%	0.204	0.19%
(f) Mixed Blend / Coated	0.900	0.37%	0.436	0.43%	1.980	1.38%	0.900	0.56%	0.500	0.27%
(g) Nylon	0.019	0.01%	0.366	0.36%	0.700	0.03%	0.043	0.03%	0.275	0.95%
(h) Vinyl			0.118	0.11%			0.136	0.10%		
(6) Organic (a) Food Waste / Rodent Bedding	29.000	21.29%	21.700	21.08%	50.100	47.10%	41.200	29.42%	31.500	29.38%
(b) Yard Waste	4.500	*******	6.900	*******	17.100	*******	3.100	*******	27.900	*******
(7) Wood	0.069	0.06%	1.300	1.46%	0.371	0.35%	0.600	0.43%	7.000	6.55%
(8) Ceramics / Rubble / Fiberglass / Gypsum Board / Asbestos	1.724	1.26%	1.736	1.09%	1.240	1.17%	0.354	0.24%	5.070	4.66%
(9) Diapers	3.900	2.56%	3.200	3.08%	0.900	0.85%	3.100	3.54%	4.000	4.43%
(10) Textiles/Leather/Rubber	1.000	0.73%	4.670	4.24%	2.550	2.40%	3.381	3.71%	4.620	4.37%
(11) Household Hazardous (a) Paints / Solvents			0.891	0.67%						
Wastes (b) Waste Oils										
(c) Pesticides/Herbicides										
(12) Dry Cell Batteries			0.048	0.06%	0.016	0.03%			0.129	0.12%
(13) Kitty Litter	3.000	3.08%					2.900	1.85%		
(14) Medical Wastes										
(15) Miscellaneous	1.900	0.96%	1.615	1.29%	0.781	0.64%	0.099	0.08%	0.550	0.50%
(16) BLUE BOX ITEMS (a) Newsprint	12.900	9.01%	0.133	0.12%	6.700	6.31%	17.900	18.99%	4.900	4.43%
(b) Liquor / Wine Bottles	2.650	2.09%			0.650	0.61%	3.600	2.57%		
(c) Food Jars / Other Bottles	2.350	1.67%					6.700	4.78%	1.060	0.95%
(d) Food Cans (i) ferrous	0.900	0.59%	0.341	0.33%	0.750	0.71%	2.900	1.57%	0.900	0.83%
(ii) non-ferrous							6.700	4.79%		
(e) Beer Cans (i) ferrous										
(ii) non-ferrous	0.010	0.01%								
(iii) American										
(f) Pop Cans (i) ferrous	0.580	0.40%			0.950	0.34%	2.930	1.88%		
(ii) non-ferrous	0.100	0.07%	0.007	0.01%	0.250	0.24%	0.900	0.36%	0.300	0.40%
(g) PET Bottles	0.357	0.36%			0.034	0.03%	0.084	0.05%	0.300	0.27%
	136.49	100.00%	102.89	100.00%	106.16	100.00%	140.08	100.00%	110.53	100.00%
*** TOTAL BLUE BOX COMPONENTS DIVIDED BY 2 *** (see 2.2.4 Data Management)	TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg	

MEAN AND STANDARD ERROR ON A WEIGHT BASIS; MEAN AND STANDARD ERROR ON A PERCENT BASIS

SAMPLE #	6 kg	6 % wt	7 kg	7 % wt	8 kg	8 % wt	9 kg	9 % wt	10 kg	10 % wt	MEAN (kg)	SE (kg)	MEAN (%)	SE (%)
(1) Paper (a) Newsprint	2.900	2.67%	6.300	8.17%	3.900	4.75%	3.000	2.98%	1.500	1.13%	4.85	0.65	4.33%	0.86%
(b) Fine Paper / CPO / Ledger	1.900	2.02%	1.000	1.77%	0.900	0.76%	1.200	1.31%	3.000	2.63%	1.49	0.20	1.38%	0.30%
(c) Magazines / Flyers	4.654	3.10%	3.300	3.63%	3.300	4.75%	6.000	7.35%	51.100	45.08%	12.17	5.37	10.56%	4.46%
(d) Waxed / Plastic / Mixed	1.800	1.82%	1.900	1.35%	1.200	1.02%	1.000	1.79%	1.800	1.41%	1.64	0.17	1.54%	0.18%
(e) Boxboard	3.300	3.67%	7.000	7.74%	2.300	1.95%	4.100	4.47%	2.200	2.58%	4.98	0.57	4.52%	0.56%
(f) Kraft	0.300	0.86%	1.100	1.22%	3.200	2.79%	1.200	1.31%	0.400	0.35%	1.71	0.40	1.47%	0.38%
(g) Wallpaper							0.100	0.11%	0.800	6.85%	0.99	0.98	0.88%	0.86%
(h) OCC	3.900	3.86%	3.000	3.52%	3.900	2.67%	1.000	1.74%	2.800	2.29%	3.53	1.00	3.54%	1.00%
(i) Tissues	4.900	3.12%	4.900	4.86%	1.000	1.61%	7.100	7.74%	1.900	1.34%	4.55	0.58	4.06%	0.67%
(2) Glass (a) Beer (i) refillable											0.00	0.00	0.02%	0.03%
(ii) non-refillable														
(b) Liquor & Wine Containers			0.000	0.68%							0.45	0.20	0.40%	0.17%
(c) Food Containers	1.900	2.02%	1.300	1.44%	2.200	2.29%	1.800	1.36%	0.900	0.71%	2.86	1.00	2.79%	1.06%
(d) SoftDrink (i) refillable											0.25	0.25	0.18%	0.18%
(ii) non-refillable											0.64	0.45	0.61%	0.41%
(e) Other Containers											0.00	0.00	0.02%	0.02%
(f) Plate														
(g) Other	0.476	0.31%	0.075	0.08%							0.15	0.06	0.13%	0.09%
(3) Ferrous (a) Soft Drink Containers	0.900	0.42%	0.100	0.11%	0.400	0.34%	0.600	0.65%	0.060	0.05%	0.25	0.07	0.33%	0.07%
(b) Food Containers	1.300	1.50%	1.700	1.88%	1.100	0.93%	1.200	1.31%	0.900	0.35%	1.79	0.30	1.61%	0.28%
(c) Beer Cans (i) returnable														
(ii) non-returnable														
(d) Aerosol Cans	0.200	0.21%			0.248	0.21%	0.400	0.64%			0.55	0.00	0.39%	0.07%
(e) Other	1.580	1.60%	1.900	2.10%	2.900	2.12%	0.900	0.87%			0.99	0.29	0.90%	0.28%
(4) Non-Ferrous (a) Beer Cans (i) returnable											0.00	0.03	0.06%	0.02%
(ii) non-returnable			0.017	0.02%							0.01	0.01	0.01%	0.01%
(iii) American														
(b) Soft Drink Containers	0.048	0.08%	0.015	0.02%	0.200	0.17%	0.300	0.35%	0.200	0.18%	0.13	0.04	0.14%	0.04%
(c) Other Packaging														
(d) Aluminum	0.900	0.33%	1.100	1.33%	0.900	0.54%	0.900	0.33%	0.100	0.09%	0.55	0.19	0.49%	0.15%
(e) Other	0.096	0.02%	0.900	0.44%			0.000	0.01%			0.03	0.04	0.08%	0.04%
(5) Plastics (a) Polyolefins	7.900	7.79%	8.900	9.78%	4.414	3.75%	7.863	6.59%	4.900	3.97%	6.86	0.52	6.53%	0.68%
(b) PVC	0.043	0.04%	0.001	0.07%	0.100	0.09%	0.400	0.44%			0.10	0.04	0.09%	0.04%
(c) Polystyrene	1.100	1.17%	1.400	1.55%	0.800	0.98%	0.800	0.85%	0.900	0.35%	0.80	0.10	0.66%	0.12%
(d) ABS														
(e) PET	0.087	0.07%	0.062	0.07%							0.04	0.00	0.04%	0.02%
(f) Mixed Blend / Coated	0.000	0.84%	1.200	1.33%	0.200	0.17%	0.000	0.83%	0.912	0.80%	0.67	0.13	0.64%	0.18%
(g) Nylon	0.060	0.06%	0.018	0.01%	0.141	0.12%	0.046	0.08%	0.600	0.33%	0.23	0.08	0.21%	0.07%
(h) Vinyl	0.263	0.99%			0.015	0.01%	0.005	0.01%	0.400	0.35%	0.09	0.04	0.09%	0.04%
(6) Organic (a) Food Waste / Rodent Bedding	34.100	30.41%	22.900	25.20%	50.700	45.02%	29.300	81.50%	12.300	10.85%	32.23	3.89	29.45%	3.43%
(b) Yard Waste	12.300	*******	18.400	*******	18.900	*******	40.100	*******	6.900	*******	13.64	3.83	*******	******
(7) Wood	0.448	0.48%	3.400	3.75%	0.903	0.17%	0.400	0.64%	0.298	0.36%	1.45	0.69	1.37%	0.60%
(8) Ceramics / Rubble / Fiberglass / Gypsum Board / Asbestos	0.825	0.88%	1.356	1.50%	0.352	0.30%			0.900	0.44%	1.51	0.46	1.21%	0.43%
(9) Diapers	1.300	1.39%	0.600	0.86%	8.900	7.98%			0.000	0.58%	3.19	0.98	2.76%	0.81%
(10) Textiles/Leather/Rubber	1.690	1.80%	3.783	4.13%	1.312	1.11%	1.618	1.76%	2.000	1.70%	2.86	0.51	2.84%	0.43%
(11) Household Hazardous (a) Paints / Solvents	4.300	4.59%	0.080	0.10%					3.310	2.93%	0.94	0.36	0.83%	0.31%
Wastes (b) Waste Oils														
(c) Pesticides/Herbicides														
(12) Dry Cell Batteries	0.023	0.03%			0.632	0.53%					0.09	0.03	0.09%	0.08%
(13) Kitty Litter	3.300	3.53%			3.200	2.72%					1.41	0.81	1.18%	0.50%
(14) Medical Wastes														
(15) Miscellaneous	0.003	0.01%	0.781	0.86%	0.000	0.76%	0.491	0.54%	0.080	0.08%	0.61	0.15	0.56%	0.14%
(16) BLUE BOX ITEMS (a) Newsprint	1.850	2.09%	3.900	4.30%	6.850	5.90%	12.400	14.80%	8.100	8.02%	7.55	1.70	6.70%	1.40%
(b) Liquor / Wine Bottles			1.300	2.18%	3.150	2.87%	3.000	2.18%	0.900	0.73%	1.61	0.44	1.30%	0.38%
(c) Food Jars / Other Bottles	1.190	1.35%	1.700	1.88%	2.080	1.74%	1.900	1.43%	0.750	0.96%	1.76	0.61	1.48%	0.43%
(d) Food Cans (i) ferrous	0.900	0.83%	0.650	0.72%	0.750	0.64%	0.900	0.98%	0.900	0.26%	0.85	0.17	0.78%	0.12%
(ii) non-ferrous											0.67	0.67	0.48%	0.48%
(e) Beer Cans (i) ferrous														
(ii) non-ferrous											0.00	0.00	0.00%	0.00%
(iii) American														
(f) Pop Cans (i) ferrous	0.100	0.11%	0.100	0.11%	1.100	0.96%	0.300	0.93%	0.900	0.64%	0.53	0.23	0.43%	0.16%
(ii) non-ferrous	0.018	0.09%	0.100	0.11%	0.100	0.09%	0.800	0.32%	0.990	0.90%	0.22	0.06	0.30%	0.09%
(g) PET Bottles	0.155	0.14%	0.334	0.99%	0.100	0.09%			0.100	0.09%	0.16	0.06	0.12%	0.08%
	85.96	100.00%	90.49	100.02%	117.84	100.00%	91.75	98.43%	113.38	100.00%	110.95		98.85%	
	TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg					

EA. 256 medium income; primarily mixed dwellings

MISCELLANEOUS ITEMS

NOTE: *** = NO WEIGHT RECORDED

SAMPLE #	ITEM	WEIGHT (kg)
1	vacuum bag	1.300
		1.3
2	vacuum (parts)	1.315
		1.315
3	heating element	0.407
	vacuum bag	[illegible]
	light bulb (1)	*******
		0.781
4	straw hat	0.099
	light bulb (2)	*******
	biodegradable bags (2)	*******
		0.099
5	plastic toy	0.350
	light bulbs (2)	*******
	biodegradable bags (4)	*******
		0.35
6	light bulbs (2)	*******
	Instabond tape	0.003
		0.003
7	soapstone sculpture	0.161
	vacuum bag	0.600
	light bulb (1)	*******
		0.761
8	vacuum bag	0.900
		0.9
9	winter gage	0.091
	vacuum bag	0.900
		0.991
10	light bulb (1)	0.080
		0.08

Ministry of the Environment
Waste Composition Study

GORE & STORRIE LIMITED

Town: FERGUS
Enumeration Area: 237 medium income; primarily multiple dwellings
n = : 10

SAMPLE #	1		2		3		4		5		6		7		8		9		10		MEAN AND STANDARD ERROR ON A WEIGHT BASIS		MEAN AND STANDARD ERROR ON A PERCENT BASIS	
	kg	% wt	kg	% wt	kg	% wt	kg	% wt	kg	% wt	kg	% wt	kg	% wt	kg	% wt	kg	% wt	kg	% wt	MEAN (kg)	SE (kg)	MEAN (%)	SE (%)
(1) Paper (a) Newsprint	10.900	10.06%	5.700	4.97%	2.800	2.32%	8.800	10.81%	12.400	11.57%	10.300	16.01%	17.600	15.62%	11.800	11.20%	30.000	23.19%	17.300	16.89%	13.15	2.11	12.99%	2.00%
(b) Fine Paper / CPO / Ledger	0.800	0.74%	2.300	2.01%	1.300	1.24%	1.600	1.76%	1.300	1.40%	0.000	0.66%	0.000	0.80%	1.100	1.10%	1.400	1.32%	4.100	3.99%	1.65	0.32	1.55%	0.30%
(c) Magazines / Flyers	0.600	0.56%	2.900	2.33%	6.100	6.72%	5.100	5.63%	1.000	0.06%	4.400	4.53%	3.300	3.11%	4.200	4.30%	7.300	6.60%	1.300	1.44%	3.65	0.79	3.00%	0.73%
(d) Waxed / Plastic / Mixed	2.200	2.16%	2.700	2.17%	3.000	2.49%	2.300	2.83%	1.200	1.19%	1.300	1.19%	1.300	1.35%	1.700	1.70%	1.300	1.29%	0.300	0.29%	1.74	0.31	1.91%	0.02%
(e) Boxboard	6.000	5.58%	10.200	8.19%	5.000	4.19%	8.300	8.95%	3.000	4.67%	3.300	3.21%	3.600	3.20%	3.700	3.70%	4.200	3.97%	2.300	2.11%	3.30	0.03	4.27%	0.54%
(f) Kraft	1.700	1.58%	1.000	0.80%	1.200	1.00%	0.000	0.99%	0.900	0.84%	1.000	0.98%	3.300	2.04%	0.700	0.70%	0.300	0.47%	1.700	1.63%	1.19	0.17	1.10%	0.19%
(g) Wallpaper																								
(h) OCC	3.900	3.63%	1.100	0.88%	2.400	1.90%	3.300	6.07%	11.200	10.54%	1.300	1.26%	3.500	3.24%	0.900	0.90%	2.400	2.07%	4.000	3.84%	3.07	1.00	3.06%	0.95%
(i) Tissues	6.000	3.63%	5.100	4.09%	6.300	5.25%	2.000	5.20%	3.000	2.80%	4.000	4.52%	3.300	3.11%	4.100	4.10%	2.000	1.89%	2.700	2.59%	3.51	0.40	3.51%	0.31%
(2) Glass (a) Beer (i) refillable	0.300	0.47%									0.000	0.86%					0.300	0.25%			0.17	0.10	0.15%	0.09%
(ii) non-refillable															0.300	0.30%					0.03	0.05	0.05%	0.06%
(b) Liquor & Wine Containers	4.075	3.78%	0.100	0.08%	2.700	2.26%			1.000	0.93%	4.000	3.96%	3.400	3.06%			5.400	5.91%	2.600	3.06%	3.13	0.53	1.96%	0.50%
(c) Food Containers	5.000	4.05%	0.700	0.56%	3.900	3.15%	4.300	4.76%	1.700	1.09%	0.100	8.01%			3.000	5.00%	4.600	4.58%	8.100	7.77%	3.60	0.77	3.70%	0.73%
(d) SoftDrink (i) refillable									0.400	0.37%					0.400	0.40%					0.08	0.00	0.06%	0.05%
(ii) non-refillable																								
(e) Other Containers			0.200	0.16%	0.300	0.25%							3.100	4.32%							0.36	0.51	0.49%	0.40%
(f) Plate					0.333	0.26%									0.023	0.02%					0.04	0.08	0.03%	0.02%
(g) Other							0.477	0.33%													0.03	0.03	0.03%	0.05%
(3) Ferrous (a) Soft Drink Containers	0.800	0.74%	0.400	0.32%	2.800	2.32%	0.400	0.44%	0.600	0.47%	0.800	0.50%	0.800	0.71%	0.300	0.30%	0.300	0.25%	1.000	0.08%	0.81	0.23	0.78%	0.19%
(b) Food Containers	1.900	1.77%	1.400	1.12%	1.000	0.83%	3.100	2.32%	1.700	1.50%	4.400	4.32%	2.700	2.04%	4.000	4.00%	1.300	1.25%	2.700	2.50%	2.28	0.36	2.19%	0.37%
(c) Beer Cans (i) returnable																								
(ii) non-returnable																								
(d) Aerosol Cans					0.104	0.14%	0.098	0.10%	0.184	0.17%	0.200	0.20%	0.222	0.20%	0.008	0.03%			0.038	0.08%	0.09	0.03	0.09%	0.03%
(e) Other	0.900	0.74%	2.000	2.25%	0.196	0.16%	0.573	0.63%	0.900	0.84%			0.100	0.09%	0.400	0.60%	3.400	3.21%			0.85	0.38	0.86%	0.34%
(4) Non-Ferrous (a) Beer Cans (i) returnable	0.200	0.19%					0.009	0.07%	0.100	0.09%	0.500	0.30%	0.100	0.09%	0.017	0.08%					0.07	0.00	0.08%	0.02%
(ii) non-returnable	0.500	0.47%	0.001	0.00%	0.300	0.17%					0.900	0.78%	0.100	0.09%	0.100	0.10%					0.19	0.08	0.17%	0.08%
(iii) American																	0.048	0.04%	0.600	0.38%	0.08	0.04	0.04%	0.04%
(b) Soft Drink Containers	0.100	0.09%	0.100	0.08%	3.300	2.76%	0.100	0.11%	0.100	0.09%	0.400	0.25%	0.000	0.53%	0.400	0.60%	0.300	0.25%	1.300	1.44%	0.64	0.33	0.60%	0.27%
(c) Other Packaging																								
(d) Aluminum	0.600	0.76%	0.400	0.32%	0.200	0.36%	0.300	0.33%	0.300	0.28%	0.100	0.10%	0.900	0.18%	0.400	0.90%	0.100	0.08%	0.300	0.29%	0.36	0.08	0.36%	0.07%
(e) Other	0.008	0.09%	1.000	1.26%	0.100	0.08%	0.008	0.00%			0.009	0.00%	0.200	0.18%			0.180	0.17%			0.22	0.18	0.19%	0.12%
(5) Plastics (a) Polyolefins	5.400	5.02%	7.000	6.24%	7.018	5.82%	5.530	6.10%	4.400	4.11%	6.600	6.48%	2.300	6.17%	7.215	7.21%	4.061	3.84%	4.600	4.32%	6.27	0.35	5.60%	0.44%
(b) PVC	0.217	0.20%	0.300	0.25%	0.200	0.17%	0.330	0.37%	0.031	0.02%	0.108	0.10%	0.090	0.02%	0.170	0.17%	0.696	0.66%	0.103	0.10%	0.23	0.06	0.21%	0.04%
(c) Polystyrene	1.300	1.12%	1.000	0.80%	0.500	0.56%	0.500	0.55%	0.200	0.09%	0.300	0.09%	0.554	0.49%	0.522	0.52%	0.300	0.28%	0.500	0.48%	0.56	0.10	0.32%	0.09%
(d) ABS							0.064	0.04%									0.145	0.18%			0.00	0.01	0.02%	0.01%
(e) PET	0.131	0.12%					0.136	0.15%	0.233	0.22%			0.300	0.27%	0.200	0.20%	0.060	0.00%	0.300	0.10%	0.15	0.03	0.18%	0.03%
(f) Mixed Blend / Coated	0.900	0.84%	0.700	0.56%	0.600	0.50%	0.900	0.48%	0.400	0.37%	0.700	0.09%	0.600	0.53%	0.800	0.80%	0.000	0.57%	1.200	1.15%	0.75	0.07	0.09%	0.07%
(g) Nylon	0.185	0.17%	0.300	0.24%	0.009	0.03%	0.229	0.25%	0.106	0.10%	0.087	0.07%	0.008	0.01%	0.100	0.10%	0.226	0.21%	2.200	2.11%	0.34	0.21	0.32%	0.23%
(h) Vinyl	0.088	0.04%	0.084	0.08%	0.003	0.00%	1.200	1.32%	0.200	0.19%	0.000	0.01%			0.300	0.30%	0.165	0.16%	0.086	0.08%	0.23	0.12	0.25%	0.17%
(6) Organic (a) Food Waste / Rodent Bedding	37.100	34.51%	40.100	32.17%	38.100	31.42%	23.100	23.48%	26.700	26.78%	30.700	30.10%	46.100	40.92%	30.400	30.34%	22.700	21.44%	25.100	24.07%	32.51	2.48	30.03%	1.61%
(b) Yard Waste		*******		*******	0.700	*******		*******		*******		*******	1.400	*******		*******		*******	0.900	*******	1.19	0.08	*******	*****
(7) Wood	0.700	0.65%	0.144	0.12%	0.384	0.32%	1.000	1.10%	0.009	0.00%	0.009	0.00%	0.700	0.62%	1.200	1.20%	0.004	0.00%	0.910	0.87%	0.51	0.14	0.40%	0.15%
(8) Ceramics / Rubble / Fiberglass /	0.700	0.65%	3.003	2.46%					3.800	3.55%	0.500	0.50%	0.700	0.62%	0.300	0.30%			4.300	4.32%	1.30	0.34	1.27%	0.95%
Gypsum Board / Asbestos																			0.000	0.00%	0.09	0.09	0.00%	0.06%
(9) Diapers	4.800	4.46%	4.000	3.26%			10.800	11.09%	8.000	8.02%	3.000	3.34%	0.900	0.98%	0.300	0.30%	4.700	4.44%	10.000	10.17%	5.47	1.17	3.51%	1.21%
(10) Textiles/Leather/Rubber	1.100	1.02%	3.800	2.23%	1.881	1.00%	4.100	4.53%	0.123	5.71%	2.000	2.33%	0.634	0.98%	3.858	3.89%	7.750	7.32%	1.157	1.09%	3.30	0.73	3.02%	0.71%
(11) Household Hazardous Wastes (a) Paints / Solvents			0.000	0.48%	0.204	0.17%															0.08	0.06	0.07%	0.08%
(b) Waste Oils																								
(c) Pesticides/Herbicides																								
(12) Dry Cell Batteries			0.083	0.07%	0.075	0.06%	0.130	0.14%	0.023	0.09%	0.018	0.00%	0.800	0.71%			0.210	0.20%	0.118	0.11%	0.15	0.08	0.19%	0.07%
(13) Kitty Litter	4.200	3.91%	0.700	0.56%	5.100	4.23%			11.000	10.26%					3.900	3.92%	4.300	4.25%	1.300	1.25%	3.27	1.15	3.04%	1.05%
(14) Medical Wastes					0.165	0.14%			0.003	0.00%	0.015	0.01%	0.314	0.28%					0.139	0.12%	0.00	0.03	0.08%	0.08%
(15) Miscellaneous			0.229	0.19%	0.018	0.01%	0.070	0.09%	0.003	0.05%	1.700	1.87%	0.981	0.95%	0.941	0.24%			0.335	0.30%	0.30	0.18	0.29%	0.15%
(16) BLUE BOX ITEMS (a) Newsprint	2.600	2.42%	12.900	9.79%	8.550	7.10%															3.34	1.39	1.90%	1.19%
(b) Liquor / Wine Bottles	0.400	0.42%	2.250	1.81%	8.600	4.60%															0.96	0.89	0.71%	0.50%
(c) Food Jars / Other Bottles			3.130	2.23%	3.900	3.19%															0.70	0.47	0.57%	0.58%
(d) Food Cans (i) ferrous	1.000	0.98%	1.350	1.84%	1.130	0.95%															0.27	0.19	0.91%	0.16%
(ii) non-ferrous																								
(e) Beer Cans (i) ferrous			8.800	1.76%																	0.33	0.33	0.19%	0.19%
(ii) non-ferrous	0.008	0.01%																			0.00	0.00	0.02%	0.02%
(iii) American	0.900	0.47%	0.400	0.36%																	0.10	0.08	0.08%	0.06%
(f) Pop Cans (i) ferrous	0.250	0.25%	0.400	0.29%	0.300	0.25%															0.10	0.08	0.08%	0.04%
(ii) non-ferrous	0.250	0.25%	0.000	0.00%	0.200	0.17%															0.03	0.03	0.04%	0.07%
(g) PET Bottles	0.100	0.08%	0.000	0.04%	0.100	0.08%															0.03	0.01	0.02%	0.01%
	107.36	100.02%	124.65	100.00%	130.31	100.02%	30.66	100.00%	107.18	100.02%	101.81	100.00%	112.64	100.00%	100.07	100.00%	106.97	100.00%	104.26	100.00%	107.30	8.12	100.02%	0.02%
*** TOTAL BLUE BOX COMPONENTS DIVIDED BY 2 *** (see 2.2.4 Data Management)	TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg					

EA: 237 medium income; primarily multiple dwellings

MISCELLANEOUS ITEMS

NOTE: *** = NO WEIGHT RECORDED

SAMPLE #	ITEM	WEIGHT (kg)
1		
2	sponge	0.200
	lightbulbs	0.029
		0.229
3	lightbulb	0.018
		0.018
4	lightbulbs	0.070
		0.07
5	lightbulbs	0.083
		0.083
6	fanbelts	0.200
	fluorescent lighter holder	0.400
	cigarette rolling machine	1.100
		1.7
7	wood knife	0.024
	fly sticks	0.367
		0.391
8	softball	0.214
	electrical tape	0.027
		0.241
9	spark plug wire	
10	glue stick	0.024
	insulated bag	0.061
	lightbulbs	0.101
	sea shells	0.139
		0.335

Ministry of the Environment
Waste Composition Study

GORE & STORRIE LIMITED

Town: FERGUS
Enumeration Area: 254 high income: primarily single detached
n = 10

SAMPLE #:	1 kg	1 % wt	2 kg	2 % wt	3 kg	3 % wt	4 kg	4 % wt	5 kg	5 % wt
(1) Paper (a) Newsprint	5.000	3.83%	4.000	4.46%	4.300	3.37%	1.200	1.03%	5.100	4.55%
(b) Fine Paper / CPO / Ledger	1.200	0.92%	1.300	1.37%	2.000	1.30%	1.400	1.39%	3.000	2.56%
(c) Magazines / Flyers	3.800	2.91%	1.400	1.28%	1.300	1.17%	8.700	7.47%	8.800	3.60%
(d) Waxed / Plastic / Mixed	2.300	1.76%	1.900	1.74%	1.600	1.20%	1.100	0.94%	2.600	2.22%
(e) Boxboard	7.300	5.74%	0.700	9.13%	8.400	7.03%	3.700	4.69%	4.000	4.18%
(f) Kraft	1.600	1.32%	1.400	1.28%	1.800	1.63%	4.200	3.61%	1.000	0.85%
(g) Wallpaper	1.300	0.96%	0.800	0.77%						
(h) OCC	2.600	1.99%	1.600	1.46%	1.800	1.83%	2.300	2.17%	3.600	3.07%
(i) Tissues	6.800	5.28%	4.200	3.64%	9.100	0.89%	2.000	1.72%	3.900	3.33%
(2) Glass (a) Beer (i) refillable										
(ii) non-refillable							0.300	0.26%		
(b) Liquor & Wine Containers	0.300	0.23%			0.900	0.67%				
(c) Food Containers	6.100	4.67%	1.300	1.37%	0.800	0.60%	2.200	1.89%		
(d) SoftDrink (i) refillable									0.700	0.60%
(ii) non-refillable										
(e) Other Containers	0.900	0.69%			0.074	0.06%				
(f) Plate							0.700	0.60%		
(g) Other									0.055	0.05%
(3) Ferrous (a) Soft Drink Containers	0.800	0.61%			0.200	0.13%	0.100	0.09%	0.100	0.09%
(b) Food Containers	1.000	1.45%	2.400	2.19%	1.200	0.90%	0.800	0.09%	0.600	0.51%
(c) Beer Cans (i) returnable										
(ii) non-returnable										
(d) Aerosol Cans	0.400	0.31%	2.019	1.84%	0.300	0.37%	0.100	0.09%		
(e) Other	0.100	0.08%	4.515	4.15%	2.665	1.99%	8.000	7.04%	4.436	3.78%
(4) Non-Ferrous (a) Beer Cans (i) returnable										
(ii) non-returnable	0.200	0.15%							0.200	0.17%
(iii) American										
(b) Soft Drink Containers	0.100	0.09%	0.100	0.09%	0.018	0.01%	0.100	0.09%	0.200	0.17%
(c) Other Packaging										
(d) Aluminum	0.900	0.09%	0.200	0.18%	0.400	0.30%	0.100	0.09%	0.500	0.43%
(e) Other							0.129	0.11%	0.700	0.60%
(5) Plastics (a) Polyolefins	9.000	7.57%	7.300	6.87%	10.700	7.03%	6.800	6.00%	6.368	5.47%
(b) PVC	0.738	0.56%	0.402	0.37%	0.100	0.12%	0.300	0.45%	0.298	0.54%
(c) Polystyrene	1.100	0.84%	0.600	0.55%	0.600	0.45%	0.400	0.34%	0.500	0.43%
(d) ABS	0.011	0.01%	2.186	2.00%						
(e) PET							0.200	0.17%	0.065	0.09%
(f) Mixed Blend / Coated	0.700	0.34%	1.069	1.00%	0.700	0.53%	0.650	0.56%	1.250	1.03%
(g) Nylon	0.215	0.16%	3.100	2.83%	0.104	0.08%	1.400	1.20%	0.100	0.08%
(h) Vinyl	0.500	0.38%	0.130	0.11%	0.012	0.01%	1.000	0.86%	1.000	0.85%
(6) Organic (a) Food Waste / Rodent Bedding	40.400	30.91%	32.400	29.82%	48.400	36.19%	19.000	19.91%	30.100	25.86%
(b) Yard Waste	8.000	*******	15.200	*******	4.300	*******	3.900	*******	21.000	*******
(7) Wood	1.300	0.99%	2.100	1.92%	0.281	0.21%	1.400	1.20%	3.700	3.13%
(8) Ceramics / Rubble / Fiberglass /	2.300	1.69%			1.381	1.10%				
Gypsum Board / Asbestos			1.600	1.39%	2.800	2.09%	1.753	1.50%		
(9) Diapers	8.400	6.43%	4.300	3.93%	4.300	3.37%	3.100	2.66%	7.000	6.74%
(10) Textiles/Leather/Rubber	2.918	2.23%	2.753	2.53%	3.522	2.03%	19.900	17.08%	2.175	1.85%
(11) Household Hazardous Wastes (a) Paints / Solvents	0.400	0.31%								
(b) Waste Oils										
(c) Pesticides/Herbicides										
(12) Dry Cell Batteries	0.020	0.03%	0.119	0.11%	0.297	0.22%	0.159	0.14%		
(13) Kitty Litter	1.600	1.28%	3.000	2.74%	8.000	3.98%			2.100	1.79%
(14) Medical Wastes					0.017	0.01%			0.019	0.02%
(15) Miscellaneous	0.644	0.49%	0.196	0.18%	1.556	1.43%	0.070	0.06%	0.436	0.39%
(16) BLUE BOX ITEMS (a) Newsprint	9.000	6.89%	9.400	7.68%	4.100	3.07%	15.100	12.36%	15.500	13.04%
(b) Liquor / Wine Bottles	1.800	1.43%	2.800	2.96%	2.250	1.88%	2.360	2.09%	1.200	1.02%
(c) Food Jars / Other Bottles	3.100	2.37%	1.000	0.91%	1.300	1.17%	0.800	0.69%	3.550	3.03%
(d) Food Cans (i) ferrous	1.300	0.99%	0.200	0.54%	0.450	0.34%	0.500	0.43%	2.400	2.05%
(ii) non-ferrous										
(e) Beer Cans (i) ferrous										
(ii) non-ferrous	0.042	0.03%					0.100	0.09%		
(iii) American	0.080	0.04%							0.090	0.04%
(f) Pop Cans (i) ferrous	0.061	0.03%	0.150	0.14%	0.500	0.37%	0.650	0.56%	0.900	0.77%
(ii) non-ferrous	0.000	0.04%	0.100	0.09%	0.060	0.04%	0.250	0.21%	0.100	0.09%
(g) PET Bottles	0.000	0.04%	0.666	0.03%	3.300	2.47%			0.100	0.08%
	130.70	100.00%	108.96	100.00%	133.75	100.00%	116.30	100.00%	117.29	100.00%
	TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg	

SAMPLE #:	6 kg	6 % wt	7 kg	7 % wt	8 kg	8 % wt	9 kg	9 % wt	10 kg	10 % wt	MEAN (kg)	SE (kg)	MEAN (%)	SE (%)
(1) Paper (a) Newsprint	3.900	2.83%	0.300	0.57%	0.300	0.31%	3.000	1.90%	4.300	3.00%	3.36	0.62	2.38%	0.49%
(b) Fine Paper / CPO / Ledger	20.600	13.58%	0.000	1.71%	2.700	2.76%	1.600	1.46%	19.100	12.73%	3.43	2.41	4.18%	1.69%
(c) Magazines / Flyers	3.900	4.46%			2.600	2.67%	3.000	2.40%	5.300	4.90%	4.01	0.89	3.23%	0.17%
(d) Waxed / Plastic / Mixed	2.100	1.39%	0.600	1.14%	22.000	22.03%	2.400	1.86%	2.600	1.29%	3.92	2.00	3.08%	2.11%
(e) Boxboard	5.700	4.31%	0.800	1.32%	3.300	3.39%	7.300	5.59%	3.300	3.55%	3.04	0.75	4.82%	0.51%
(f) Kraft	1.000	0.76%	0.300	0.57%	1.600	1.55%	1.600	1.24%	1.000	0.67%	1.33	0.33	1.32%	0.28%
(g) Wallpaper											0.21	0.14	0.17%	0.12%
(h) OCC	4.300	3.23%	4.300	8.15%	9.700	9.81%	3.300	2.49%	3.000	2.00%	3.06	0.30	2.97%	0.68%
(i) Tissues	5.300	4.01%	0.600	1.16%	3.900	3.99%	6.700	5.21%	6.600	4.35%	4.87	0.43	5.01%	0.57%
(2) Glass (a) Beer (i) refillable														
(ii) non-refillable							1.200	0.93%			0.15	0.12	0.12%	0.09%
(b) Liquor & Wine Containers			0.300	0.58%			0.600	0.47%	3.600	1.73%	0.46	0.28	0.85%	0.17%
(c) Food Containers	0.400	0.30%	0.400	0.76%	0.400	0.41%	3.300	2.73%	3.100	2.07%	1.34	0.81	1.46%	0.43%
(d) SoftDrink (i) refillable											0.07	0.07	0.06%	0.06%
(ii) non-refillable														
(e) Other Containers	0.500	0.38%									0.15	0.10	0.11%	0.07%
(f) Plate					0.028	0.03%					0.07	0.07	0.06%	0.06%
(g) Other					0.056	0.06%					0.01	0.01	0.01%	0.01%
(3) Ferrous (a) Soft Drink Containers	0.100	0.08%			0.080	0.08%	0.300	0.23%	0.400	0.27%	0.36	0.06	0.13%	0.06%
(b) Food Containers	0.800	0.61%	0.300	0.58%	0.300	0.31%	1.300	1.01%	3.800	2.55%	1.33	0.33	1.06%	0.24%
(c) Beer Cans (i) returnable														
(ii) non-returnable														
(d) Aerosol Cans			0.347	0.47%			1.000	0.79%	0.074	0.03%	0.43	0.20	0.90%	0.18%
(e) Other	0.474	0.36%	0.018	0.03%	0.023	0.03%	2.493	1.94%	3.300	2.55%	2.71	0.89	2.23%	0.77%
(4) Non-Ferrous (a) Beer Cans (i) returnable							0.018	0.01%	0.200	0.15%	0.00	0.00	0.01%	0.01%
(ii) non-returnable									0.100	0.07%	0.06	0.06	0.04%	0.06%
(iii) American														
(b) Soft Drink Containers			0.100	0.10%			0.300	0.23%	0.200	0.13%	0.11	0.03	0.10%	0.03%
(c) Other Packaging	0.500	0.13%	0.018	0.03%							0.00	0.09	0.02%	0.06%
(d) Aluminum			0.100	0.10%	0.300	0.21%	0.300	0.30%	0.200	0.13%	0.31	0.06	0.23%	0.06%
(e) Other							0.400	0.31%			0.12	0.06	0.10%	0.06%
(5) Plastics (a) Polyolefins	8.088	9.84%	1.800	3.41%	4.700	4.64%	9.300	7.17%	9.300	6.30%	7.48	0.84	6.17%	0.47%
(b) PVC	0.451	0.34%			0.360	0.27%			0.326	0.22%	0.31	0.07	0.36%	0.06%
(c) Polystyrene	0.600	0.43%	0.100	0.10%	0.200	0.21%	0.900	0.70%	0.400	0.27%	0.54	0.09	0.44%	0.07%
(d) ABS	0.122	0.09%			0.018	0.04%					0.33	0.23	0.30%	0.21%
(e) PET			0.018	0.03%					0.200	0.17%	0.06	0.03	0.04%	0.06%
(f) Mixed Blend / Coated	0.600	0.45%	0.100	0.19%			1.098	0.83%	0.600	0.40%	0.98	0.13	0.56%	0.11%
(g) Nylon	0.084	0.06%	0.011	0.03%	0.100	0.10%	0.895	0.70%	3.300	2.19%	0.92	0.46	0.74%	0.32%
(h) Vinyl	0.800	0.58%	0.092	0.17%			1.280	0.99%	0.106	0.07%	0.50	0.16	0.41%	0.10%
(6) Organic (a) Food Waste / Rodent Bedding	35.800	27.08%	6.800	12.92%	33.100	33.08%	40.800	31.70%	45.600	30.24%	33.09	3.98	27.91%	2.37%
(b) Yard Waste	22.800	*******	15.600	*******	9.300	*******	70.800	*******	73.100	*******	24.09	8.22	*******	*******
(7) Wood	0.125	0.09%	0.010	0.02%	0.065	0.07%	0.181	0.13%	0.500	0.34%	0.98	0.38	0.81%	0.33%
(8) Ceramics / Rubble / Fiberglass /	0.444	0.34%							0.625	0.42%	0.49	0.25	0.36%	0.19%
Gypsum Board / Asbestos											0.62	0.22	0.49%	0.36%
(9) Diapers	5.400	4.08%	0.500	0.38%					11.300	7.00%	4.35	1.24	3.38%	0.89%
(10) Textiles/Leather/Rubber	1.600	1.21%	4.202	7.97%	0.945	0.97%	21.977	17.08%	0.871	0.58%	6.09	2.30	5.41%	2.03%
(11) Household Hazardous Wastes (a) Paints / Solvents			0.900	1.71%			0.686	0.53%			0.30	0.11	0.23%	0.17%
(b) Waste Oils					7.800	8.08%					0.78	0.78	0.80%	0.80%
(c) Pesticides/Herbicides														
(12) Dry Cell Batteries	0.094	0.07%			0.014	0.01%	0.064	0.03%	0.300	0.20%	0.11	0.04	0.08%	0.03%
(13) Kitty Litter	7.000	5.30%			1.300	1.36%					2.32	0.93	1.95%	0.70%
(14) Medical Wastes							3.436	2.06%	0.017	0.01%	0.35	0.34	0.27%	0.27%
(15) Miscellaneous	0.080	0.07%	9.557	18.12%	0.555	0.57%	0.300	0.23%	2.700	1.80%		1.07		1.09%
(16) BLUE BOX ITEMS (a) Newsprint	7.600	5.73%	12.850	24.36%	3.350	3.45%	3.650	2.76%	7.350	4.90%	8.96	1.42	9.38%	2.12%
(b) Liquor / Wine Bottles	5.300	5.55%	3.450	6.84%	0.650	0.67%	0.880	0.96%	1.860	1.23%	2.27	0.42	2.20%	0.57%
(c) Food Jars / Other Bottles	3.700	2.80%	3.600	6.82%	2.300	2.37%	1.250	0.87%	0.300	0.33%	2.13	0.40	2.14%	0.60%
(d) Food Cans (i) ferrous	1.300	1.17%	0.250	0.47%	1.060	1.09%	0.300	0.18%	1.450	0.97%	0.98	0.22	0.85%	0.17%
(ii) non-ferrous														
(e) Beer Cans (i) ferrous														
(ii) non-ferrous	0.100	0.08%			0.800	0.81%			0.010	0.01%	0.00	0.00	0.04%	0.08%
(iii) American											0.01	0.01	0.01%	0.01%
(f) Pop Cans (i) ferrous	0.350	0.26%			0.150	0.13%	0.300	0.16%	0.022	0.01%	0.33	0.07	0.19%	0.02%
(ii) non-ferrous	0.150	0.11%			0.066	0.05%	0.800	0.18%	0.016	0.01%	0.09	0.03	0.09%	0.02%
(g) PET Bottles			0.080	0.08%			0.078	0.06%			0.98	0.83	0.27%	0.34%
	132.30	100.00%	52.75	100.00%	97.30	100.00%	129.70	99.87%	150.11	100.00%	118.98		99.99%	
	TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg					

*** TOTAL BLUE BOX COMPONENTS DIVIDED BY 3 ***
(see 3.3.4 Data Management)

MEAN AND STANDARD ERROR ON A WEIGHT BASIS

MEAN AND STANDARD ERROR ON A PERCENT BASIS

EA: 254 high income: primarily single detached

MISCELLANEOUS ITEMS

NOTE: *** = NO WEIGHT RECORDED

SAMPLE #	ITEM	WEIGHT (kg)
1	wheelbearing grease tube	0.186
	vacuum bag	0.100
	lightbulb	0.059
	biodegradable bags	0.300
		0.644
2	sponge	0.052
	vacuum bags	********
	lightbulbs	0.144
		0.196
3	lightbulbs	0.138
	vacuum bags	1.7
	biodegradable bags	0.1
		1.988
4	ant traps	0.058
	twine	0.012
		0.07
5	bucket of stucco	4.300
	lightbulbs	0.080
		4.38
6	lightbulb	0.086
		0.086
7	playpen	9.500
	lightbulbs	0.057
		9.557
8	vacuum bag	0.500
	golfball	0.046
	sponge	0.008
		0.555
9	arborite	0.088
	lightbulbs	0.312
		0.3
10	dried food packages	0.400
	furnace filter	0.800
	cable hose	0.395
	brake shoes	1.900
	rope w steel braids	0.007
	scotch tape rolls	0.093
		2.798

Ministry of the Environment
Waste Composition Study

GORE & STORRIE LIMITED

Town: FERGUS
Enumeration Area: 260 low income; primarily multiple dwellings
n = 8

SAMPLE #:	1 kg	1 % wt	2 kg	2 % wt	3 kg	3 % wt	4 kg	4 % wt	5 kg	5 % wt	6 kg	6 % wt	7 kg	7 % wt	8 kg	8 % wt	MEAN AND STANDARD ERROR ON A WEIGHT BASIS: MEAN (kg)	SE (kg)	MEAN AND STANDARD ERROR ON A PERCENT BASIS: MEAN (%)	SE (%)
(1) Paper (a) Newsprint	2.400	2.31%	7.700	7.33%	2.000	1.97%	9.900	9.73%	2.400	2.17%	3.400	3.06%	11.800	11.07%	29.300	20.99%	8.58	3.24	7.33%	2.53%
(b) Fine Paper / CPO / Ledger	1.000	0.96%	1.800	1.75%	1.400	1.58%	0.900	0.88%	2.700	2.44%	0.200	4.69%	1.300	1.04%	0.700	0.50%	1.68	0.52	1.73%	0.47%
(c) Magazines / Flyers	1.000	1.63%	1.900	1.81%	1.000	1.87%	7.300	7.18%	2.800	2.17%	8.800	7.95%	1.700	1.63%	4.542	3.25%	3.81	0.99	3.46%	0.91%
(d) Waxed / Plastic / Mixed	1.700	1.04%	2.000	1.91%	2.300	2.29%	2.300	2.29%	1.000	1.72%	1.800	1.71%	1.500	1.43%	2.100	1.50%	1.08	0.10	1.80%	0.11%
(e) Boxboard	3.600	3.86%	4.200	4.01%	3.300	3.21%	4.800	4.72%	0.400	3.79%	3.000	4.31%	4.100	3.91%	5.800	4.16%	4.03	0.32	4.40%	0.25%
(f) Kraft	0.800	0.77%	1.400	1.34%	0.300	0.29%	0.800	0.79%	0.000	0.81%	0.800	0.72%	0.200	0.19%	0.700	0.50%	0.74	0.13	0.68%	0.12%
(g) Wallpaper											6.900	0.22%					0.86	0.86	0.78%	0.78%
(h) OCC	0.800	0.77%	0.611	0.58%	0.000	0.89%	3.300	3.24%	4.700	4.23%	4.100	3.79%	12.100	11.55%	7.100	5.09%	4.59	1.38	3.76%	1.27%
(i) Tissues	2.300	2.21%	3.600	3.43%	2.500	2.46%	2.300	2.26%	4.100	3.71%	3.300	2.97%	2.500	2.39%	3.400	2.44%	3.00	0.24	2.73%	0.20%
(2) Glass (a) Beer (i) refillable	0.500	0.48%													1.000	0.72%	0.19	0.15	0.17%	0.10%
(ii) non-refillable																				
(b) Liquor & Wine Containers									0.300	0.45%	0.331	0.21%	1.700	1.63%	8.700	6.23%	1.39	1.08	1.08%	0.76%
(c) Food Containers	2.500	2.45%	4.900	4.67%	3.800	3.73%	2.400	2.36%	3.000	2.72%	1.000	0.05%	4.400	4.20%	13.600	9.74%	4.40	1.38	3.79%	0.04%
(d) Soft Drink (i) refillable																				
(ii) non-refillable																				
(e) Other Containers					0.600	0.59%					0.042	0.04%	0.230	0.22%			0.11	0.08	0.11%	0.07%
(f) Flats							0.341	0.34%							0.094	0.07%	0.05	0.04	0.05%	0.04%
(g) Other					0.135	0.13%			0.670	0.61%	0.320	0.29%	0.149	0.14%	0.500	0.36%	0.22	0.09	0.19%	0.08%
(3) Ferrous (a) Soft Drink Containers	0.048	0.05%	0.400	0.38%			0.300	0.29%	0.100	0.09%	0.031	0.03%	0.700	0.67%	0.500	0.36%	0.26	0.09	0.23%	0.09%
(b) Food Containers	1.000	1.34%	1.700	1.63%	0.700	0.09%	0.800	0.79%	1.600	1.43%	1.100	0.09%	2.300	2.20%	1.700	1.22%	1.44	0.19	1.31%	0.16%
(c) Beer Cans (i) returnable																				
(ii) non-returnable																				
(d) Aerosol Cans			0.400	0.39%	0.300	0.21%	0.117	0.12%	0.300	0.43%	0.300	0.27%	0.700	0.67%	0.100	0.07%	0.29	0.06	0.27%	0.09%
(e) Other	0.800	0.77%	0.300	0.19%	0.022	0.05%	1.454	1.43%	1.600	1.83%	1.160	1.07%	3.700	3.33%	5.903	4.23%	1.68	0.70	1.61%	0.34%
(4) Non-Ferrous (a) Beer Cans (i) returnable													0.100	0.10%	0.300	0.14%	0.04	0.03	0.05%	0.03%
(ii) non-returnable	0.100	0.10%					0.300	0.29%					0.700	0.67%	0.200	0.18%	0.16	0.09	0.13%	0.08%
(iii) American																				
(b) Soft Drink Containers			0.034	0.05%	0.100	0.10%	0.047	0.05%	0.400	0.36%	0.079	0.07%	0.300	0.29%	0.063	0.05%	0.12	0.03	0.12%	0.05%
(c) Other Packaging																				
(d) Aluminum	0.341	0.52%	0.300	0.29%	0.300	0.49%	0.100	0.10%	0.800	0.73%	0.400	0.36%	0.400	0.36%	0.200	0.14%	0.41	0.06	0.39%	0.07%
(e) Other	0.010	0.01%					0.020	0.02%	0.000	0.01%	0.000	0.05%			0.010	0.01%	0.01	0.01	0.01%	0.01%
(5) Plastics (a) Polyolefins	4.600	4.42%	0.554	0.25%	6.800	6.78%	3.400	3.51%	0.905	0.85%	4.629	4.17%	3.918	6.66%	5.300	3.85%	5.13	0.45	3.80%	0.33%
(b) PVC	0.037	0.04%	0.133	0.13%	0.300	0.29%	0.208	0.20%	0.300	0.18%	0.298	0.27%	0.100	0.10%	0.509	0.36%	0.21	0.03	0.18%	0.04%
(c) Polystyrene	1.000	0.96%	0.800	0.76%	0.400	0.39%	0.400	0.39%	0.300	0.43%	1.000	0.05%	1.200	1.13%	0.700	0.50%	0.73	0.11	0.69%	0.10%
(d) ABS			0.300	0.10%					0.080	0.06%			0.300	0.19%			0.08	0.03	0.06%	0.05%
(e) PET	0.135	0.13%					0.300	0.20%			0.048	0.04%	0.300	0.18%	0.500	0.36%	0.14	0.06	0.11%	0.05%
(f) Mixed Blend / Coated	0.500	0.48%	0.500	0.46%	0.400	0.39%	0.500	0.49%	0.600	0.54%	0.300	0.27%	0.400	0.38%	0.400	0.29%	0.45	0.05	0.45%	0.04%
(g) Nylon	1.600	1.63%	0.073	0.07%	0.011	0.01%	0.036	0.04%	0.231	0.21%	0.300	0.27%	2.600	2.48%	0.500	0.36%	0.71	0.35	0.66%	0.34%
(h) Vinyl	1.000	0.96%					0.700	0.09%	0.146	0.13%	0.042	0.04%	0.153	0.17%	0.300	0.21%	0.20	0.13	0.27%	0.13%
(6) Organic (a) Food Waste / Rodent Bedding	24.700	33.76%	34.500	31.80%	36.400	37.73%	36.700	36.07%	34.400	31.14%	20.800	18.75%	12.600	18.05%	18.106	13.69%	30.13	4.74	30.17%	4.83%
(b) Yard Waste	0.100	*******	13.300	*******	3.300	*******	1.000	*******	9.100	*******	12.400	*******		*******	0.300	*******	4.90	2.00	*******	******
(7) Wood	0.300	0.29%	0.700	0.67%	0.076	0.07%	0.066	0.06%	0.700	0.63%	3.000	3.23%	12.401	11.84%	12.310	8.83%	3.79	1.06	3.22%	1.53%
(8) Ceramics / Rubble / Fiberglass / Gypsum Board / Asbestos	12.622	12.14%	1.300	1.14%	0.025	0.05%	0.775	0.76%	0.500	0.43%	1.245	1.13%	0.346	0.33%	1.700	1.22%	2.35	1.48	2.17%	1.43%
(9) Diapers	0.200	0.19%	0.300	0.23%	3.300	3.21%	4.400	4.33%	0.082	0.07%	0.300	0.27%	7.000	7.54%	3.300	2.29%	2.71	1.03	2.32%	1.01%
(10) Textiles/Leather/Rubber	3.900	3.58%	0.400	0.36%	0.000	0.89%	3.400	3.34%	0.592	0.54%	13.720	12.37%	8.700	8.81%	4.048	3.33%	4.77	1.64	4.34%	1.50%
(11) Household Hazardous Wastes (a) Paints / Solvents									0.860	0.79%	2.080	1.85%	0.112	0.11%			0.32	0.26	0.34%	0.23%
(b) Waste Oils																				
(c) Pesticides/Herbicides	0.275	0.39%							0.000	0.03%	0.244	0.22%					0.07	0.04	0.06%	0.04%
(12) Dry Cell Batteries			0.068	0.06%	0.046	0.06%	0.020	0.03%	0.337	0.21%	0.599	0.54%			0.112	0.08%	0.14	0.07	0.12%	0.06%
(13) Kitty Litter	6.300	0.06%	5.200	4.96%	10.000	10.61%			7.400	6.70%							3.71	1.51	3.34%	1.43%
(14) Medical Wastes							0.015	0.01%	1.015	0.03%			0.932	0.89%			0.33	0.16	0.23%	0.13%
(15) Miscellaneous	19.985	19.22%	0.087	0.09%	1.608	1.58%	0.009	0.04%	2.568	2.06%	0.568	0.31%	0.403	0.38%	0.705	0.51%	3.36	2.41	3.13%	2.83%
(16) BLUE BOX ITEMS (a) Newsprint	2.000	1.97%			8.400	9.24%	8.450	8.31%	8.400	8.31%	13.500	12.17%					6.35	1.32	5.09%	1.78%
(b) Liquor / Wine Bottles	0.265	0.23%			0.156	0.17%	1.400	1.58%	2.750	2.49%	0.800	0.81%					0.68	0.35	0.63%	0.33%
(c) Food Jars / Other Bottles	0.900	0.77%	2.000	1.91%	8.430	2.41%	0.800	0.09%	3.750	3.39%	1.330	1.23%					1.37	0.46	1.29%	0.45%
(d) Food Cans (i) ferrous	0.600	0.58%	0.330	0.38%	1.150	1.13%	0.400	0.39%	1.400	1.27%	0.300	0.30%					0.34	0.17	0.33%	0.18%
(ii) non-ferrous																				
(e) Beer Cans (i) ferrous																				
(ii) non-ferrous			0.069	0.09%	0.400	0.39%			0.000	0.06%							0.08	0.03	0.06%	0.05%
(iii) American																				
(f) Pop Cans (i) ferrous	0.000	0.06%	0.650	0.63%	0.300	0.39%	0.250	0.27%	0.700	0.63%	0.600	0.34%					0.34	0.11	0.33%	0.10%
(ii) non-ferrous	0.050	0.05%	0.250	0.24%	0.018	0.09%	0.300	0.29%	0.080	0.05%	0.100	0.09%					0.10	0.04	0.09%	0.04%
(d) PET Bottles			0.000	0.06%					0.000	0.06%	0.100	0.08%					0.03	0.01	0.05%	0.01%
	103.87	100.00%	104.92	100.00%	101.73	100.00%	101.73	100.00%	110.47	100.00%	110.94	100.05%	104.74	100.00%	139.57	100.00%	109.73		100.00%	
	TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg					

*** TOTAL BLUE BOX COMPONENTS DIVIDED BY 8 ***
(see 8.8.4 Data Management)

Town: FERGUS
EA: 260 low income; primarily multiple dwellings

MISCELLANEOUS ITEMS

NOTE: *** = NO WEIGHT RECORDED

SAMPLE #	ITEM	WEIGHT (kg)
1	playpen	8.800
	skillsaw	2.400
	training wheels	0.600
	paint covered plastics	7.800
	hair dryer	0.300
	tennis racket	0.400
	lightbulbs	0.085
		19.985
2	sponges	0.021
	shells	0.066
		0.087
3	scale (bathroom)	1.600
	latex prophylactics	0.008
		1.608
4	lightbulb	0.004
	hemp rope	0.005
		0.009
5	vacuum cleaner bags	1.300
	coffee maker	0.400
	lightbulbs	0.149
	flood light cable	0.700
	caulking tube	0.019
		2.568
6	lightbulbs	0.083
	clay	0.429
	rope	0.022
	sponge	0.024
		0.568
7	vibrating foot bath	1.600
	lightbulbs	0.071
	aspirator	0.020
	ant trap	0.020
	hair dryer	0.492
		2.603
8	wall hanging	0.608
	candle	0.600
	shell bracelet	0.008
		0.708

Ministry of the Environment
Waste Composition Study

GORE & STORRIE LIMITED

Town: FERGUS
Enumeration Area: 262 medium income: primarily single detached
n = 10

SAMPLE #	1 kg	1 % wt	2 kg	2 % wt	3 kg	3 % wt	4 kg	4 % wt	5 kg	5 % wt	6 kg	6 % wt	7 kg	7 % wt	8 kg	8 % wt	9 kg	9 % wt	10 kg	10 % wt	MEAN AND STANDARD ERROR ON A WEIGHT BASIS: MEAN (kg)	SE (kg)	MEAN AND STANDARD ERROR ON A PERCENT BASIS: MEAN (%)	SE (%)
(1) Paper (a) Newsprint	2.400	2.44%	4.800	3.53%	0.000	0.57%			1.900	1.75%	0.213	0.13%	6.900	7.48%	2.900	2.30%	1.960	0.06%	1.600	1.23%	2.83	0.65	2.09%	0.73%
(b) Fine Paper / CPO / Ledger	1.100	1.12%	0.400	0.29%	1.900	1.23%	0.600	0.44%	1.200	1.41%	0.800	0.61%	3.000	2.06%	1.400	1.29%	0.600	0.73%	0.700	0.84%	1.13	0.23	1.04%	0.33%
(c) Magazines / Flyers	1.960	1.22%	1.600	1.32%	4.900	4.29%	2.600	1.91%	2.900	2.03%	0.800	0.61%	0.600	0.53%	0.200	0.18%	0.200	0.12%	1.800	1.06%	1.82	0.42	1.48%	0.41%
(d) Wsaes / Plastic / Mixed	2.960	2.23%	1.300	1.56%	1.000	1.31%	1.700	1.29%	2.400	2.61%	2.000	1.98%	2.000	2.30%	1.900	1.75%	4.000	3.59%	2.300	2.12%	2.32	0.22	2.09%	0.33%
(e) Boxboard	5.600	5.96%	4.600	3.37%	5.106	4.61%	6.900	4.56%	3.400	6.53%	5.800	4.41%	1.000	0.89%	8.900	7.33%	6.000	5.91%	6.100	5.61%	5.31	0.00	4.96%	0.59%
(f) Kraft	0.800	0.81%	1.000	0.73%	1.900	1.23%	3.000	2.87%	1.000	1.17%	1.000	1.64%	1.000	0.89%	1.000	1.47%	1.000	0.00%	0.900	0.23%	1.54	0.31	1.18%	0.33%
(g) Wallpaper			0.000	0.08%													1.000	0.30%			0.19	0.13	0.16%	0.11%
(h) OCC	4.000	4.06%	4.900	5.50%	2.600	2.64%	5.800	4.12%	1.900	1.41%	1.300	0.08%	3.000	4.45%	3.000	1.84%	0.800	0.73%	2.600	2.50%	3.03	0.54	2.62%	0.42%
(i) Tissues	3.400	3.43%	4.900	2.50%	4.960	3.06%	4.800	3.16%	3.900	3.67%	3.300	4.05%	3.600	3.19%	7.100	6.53%	8.106	7.25%	4.600	4.43%	4.00	0.50	4.33%	0.44%
(2) Glass (a) Beer (i) refillable																								
(ii) non-refillable																								
(b) Liquor & Wine Containers	6.100	5.13%	0.700	0.81%	2.700	1.98%	0.537	0.75%			0.310	0.24%	3.200	2.85%	1.106	1.01%			0.067	0.06%	1.33	0.52	1.26%	0.52%
(c) Food Containers	4.300	4.98%	10.000	7.93%	3.600	3.40%	1.600	1.03%	1.900	2.99%	2.000	1.52%	2.000	1.77%	4.100	3.77%	7.900	6.34%	3.106	2.85%	4.09	0.87	3.34%	0.84%
(d) SoftDrink (i) refillable			0.734	0.54%																	0.07	0.07	0.05%	0.05%
(ii) non-refillable											1.900	0.91%			3.000	2.73%					0.48	0.31	0.37%	0.73%
(e) Other Containers																								
(f) Plate			0.000	0.64%																	0.06	0.06	0.04%	0.04%
(g) Other			0.500	0.97%	6.209	5.30%					0.400	0.32%	3.400	4.73%					2.600	3.50%	1.63	0.79	1.48%	0.79%
(3) Ferrous (a) Soft Drink Containers	2.600	2.64%	1.100	0.81%	0.900	0.10%	1.900	0.96%	0.900	0.83%			0.900	0.27%	0.045	0.04%	0.000	0.84%	1.100	1.01%	0.76	0.27	0.09%	0.27%
(b) Food Containers	1.106	1.12%	11.700	8.57%	1.600	1.70%	1.200	0.88%	1.400	1.64%	5.200	3.93%	2.900	2.21%	2.200	2.02%	0.400	0.86%	3.600	3.50%	3.13	1.06	2.00%	0.73%
(c) Beer Cans (i) returnable																								
(ii) non-returnable																								
(d) Aerosol Cans	0.100	0.10%	4.200	2.08%					0.220	0.26%			0.700	0.63%	0.358	0.33%	0.300	0.43%			0.61	0.41	0.48%	0.30%
(e) Other	1.310	1.34%	4.600	3.52%			0.150	0.12%			0.700	0.38%			0.175	0.16%	0.000	0.00%	0.182	0.17%	0.74	0.47	0.59%	0.33%
(4) Non-Ferrous (a) Beer Cans (i) returnable							0.071	0.03%			0.106	0.08%			0.039	0.04%	0.700	0.63%			0.05	0.07	0.09%	0.08%
(ii) non-returnable	0.800	0.81%											0.039	0.03%					0.200	0.18%	0.10	0.08	0.19%	0.08%
(iii) American											0.800	0.61%									0.08	0.08	0.06%	0.06%
(b) Soft Drink Containers																								
(c) Other Packaging																								
(d) Aluminum	0.900	0.90%	0.700	0.51%	0.400	0.38%	0.900	0.32%	0.800	1.00%	0.900	0.35%	0.800	0.35%	0.400	0.37%	0.300	0.43%	0.400	0.37%	0.50	0.06	0.65%	0.07%
(e) Other	0.153	0.15%	2.600	2.05%	0.144	0.14%															0.31	0.26	0.23%	0.30%
(5) Plastics (a) Polyolefins	5.800	5.09%	12.000	8.40%	7.200	6.79%	7.000	5.61%	7.300	9.14%	8.106	6.91%	6.900	5.76%	9.800	9.01%	8.900	7.43%	7.600	7.16%	8.31	0.65	7.94%	0.43%
(b) PVC	0.072	0.07%	1.300	0.85%	1.283	1.21%	0.162	0.12%	0.118	0.14%	0.500	0.35%	0.300	0.18%	0.062	0.06%					0.34	0.13	0.29%	0.11%
(c) Polystyrene	1.000	1.00%	1.400	1.06%	0.000	0.57%	0.700	0.31%	0.400	0.47%	0.800	0.61%	1.000	0.89%	0.800	0.74%	1.000	0.05%	0.700	0.64%	0.84	0.09	0.78%	0.07%
(d) ABS											0.304	0.23%			0.125	0.11%					0.04	0.06	0.03%	0.02%
(e) PET			0.900	0.13%					0.100	0.33%			0.061	0.05%	0.900	0.85%			0.064	0.06%	0.10	0.06	0.03%	0.03%
(f) Mixed Blend / Coated	0.500	0.51%	0.200	0.13%	0.600	0.57%	0.500	0.37%	0.900	0.33%	0.900	0.23%	0.200	0.18%	0.035	0.03%	0.800	0.81%	1.300	1.30%	0.66	0.12	0.44%	0.11%
(g) Nylon	0.014	0.01%			0.014	0.01%	0.900	0.37%	0.000	0.01%	0.106	0.08%	0.106	0.09%	0.100	0.09%	0.106	0.09%	0.106	0.09%	0.10	0.06	0.08%	0.03%
(h) Vinyl	1.600	1.33%	1.900	0.95%			1.204	0.80%					7.100	6.29%							1.06	0.69	0.94%	0.63%
(6) Organic (a) Food Waste / Rodent Bedding	27.300	27.73%	32.000	23.43%	28.400	26.73%	56.700	41.71%	35.000	43.25%	47.900	35.95%	21.600	19.15%	35.600	35.95%	42.500	37.99%	45.600	45.12%	37.06	3.33	32.06%	2.61%
(b) Yard Waste	7.900	*******	30.600	*******	2.900	*******	22.450	*******	19.800	*******	9.700	*******	17.900	*******	2.000	*******	0.400	*******		*******	11.31	3.37	*******	*******
(7) Wood	0.800	0.81%	2.900	2.12%	1.346	1.27%	0.455	0.33%	0.500	0.50%	0.463	0.35%	0.300	0.27%	0.017	0.02%	0.200	0.18%	0.165	0.12%	0.71	0.27	0.61%	0.21%
(8) Ceramics / Rubble / Fiberglass /	0.219	0.22%	5.300	4.03%	3.842	3.62%	0.193	0.14%	0.106	0.12%			5.987	5.31%	0.061	0.06%					1.39	0.79	1.33%	0.85%
Gypsum Board / Asbestos			5.300	4.00%	1.400	1.62%															0.60	0.50	0.54%	0.41%
(9) Diapers	11.700	11.89%	2.500	1.83%	7.000	7.17%	11.900	8.91%	8.100	0.49%	2.900	2.20%	10.000	9.59%			4.800	4.32%			5.05	1.63	5.65%	1.57%
(10) Textiles/Leather/Rubber	5.200	5.29%	3.400	2.49%	3.106	4.61%	6.000	4.41%	0.471	0.55%	1.413	1.07%	5.600	5.37%	3.013	2.77%	0.999	0.27%	2.600	2.59%	2.05	0.58	2.34%	0.49%
(11) Household Hazardous Wastes (a) Paints / Solvents	0.400	0.41%	0.000	0.05%	0.683	0.64%	0.339	0.90%			0.183	0.14%									0.27	0.11	0.22%	0.09%
(b) Waste Oils																								
(c) Pesticides/Herbicides							0.261	0.21%													0.06	0.08	0.03%	0.00%
(12) Dry Cell Batteries					0.098	0.08%			0.030	0.04%	0.064	0.05%			0.069	0.03%	0.016	0.01%	0.016	0.07%	0.05	0.01	0.03%	0.01%
(13) Kitty Litter	4.600	4.67%			5.100	4.81%			0.900	1.05%	10.600	2.20%	6.900	7.53%	0.300	6.45%	7.800	0.83%	15.700	12.61%	5.09	1.50	5.40%	1.30%
(14) Medical Wastes															0.500	0.46%					0.05	0.05	0.00%	0.05%
(15) Miscellaneous			0.300	0.22%	2.700	2.55%	2.600	1.91%	1.600	1.88%	5.410	2.50%	2.730	2.42%	0.135	0.12%			1.544	1.42%	1.30	0.42	1.31%	0.35%
(16) BLUE BOX ITEMS (a) Newsprint	3.900	3.55%	2.700	1.99%	0.400	0.40%	8.100	6.99%	2.400	2.61%	16.106	15.73%	1.650	1.54%	4.650	4.25%	8.200	7.54%	1.650	1.33%	5.26	1.66	4.40%	1.34%
(b) Liquor / Wine Bottles					1.100	1.04%	1.250	0.93%	1.250	1.47%	0.550	0.40%	0.800	0.35%	2.350	2.16%	2.350	2.00%	1.900	1.30%	1.06	0.94	0.95%	0.24%
(c) Food Jars / Other Bottles	0.900	0.90%			1.800	1.91%	4.600	3.08%	0.900	0.99%	5.350	2.54%	0.900	0.35%	5.000	5.75%	0.950	0.31%	0.900	0.26%	1.40	0.49	1.17%	0.36%
(d) Food Cans (i) ferrous	0.800	0.30%	0.000	0.04%	0.250	0.24%	2.150	1.48%	0.450	0.53%	1.960	0.91%	0.660	0.75%	0.900	0.46%	0.250	0.67%	0.150	0.14%	0.66	0.50	0.55%	0.15%
(ii) non-ferrous																								
(e) Beer Cans (i) ferrous																								
(ii) non-ferrous					0.050	0.05%	0.100	0.07%			0.300	0.75%	0.106	0.09%	0.100	0.09%	0.050	0.04%	0.150	0.14%	0.08	0.03	0.07%	0.02%
(iii) American																								
(f) Pop Cans (i) ferrous																								
(ii) non-ferrous			0.900	0.37%	0.700	0.66%	0.330	0.28%	0.138	0.18%	0.650	0.49%	0.900	0.18%	0.330	0.31%	0.900	0.81%	0.350	0.25%	0.44	0.08	0.37%	0.08%
(g) PET Bottles	0.100	0.10%			0.026	0.00%	0.100	0.07%	0.001	0.04%	0.138	0.11%					0.100	0.09%	0.050	0.00%	0.04	0.04	0.00%	0.01%
	[illegible]	100.00%	136.66	100.00%	100.00	100.00%	135.95	100.00%	85.82	100.00%	131.63	100.00%	112.83	100.00%	108.75	100.00%	111.63	98.49%	106.86	100.00%	113.58		99.99%	
*** TOTAL BLUE BOX COMPONENTS DIVIDED BY 8 *** (see Methods & Materials)	TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg					

MISCELLANEOUS ITEMS

NOTE: *** = NO WEIGHT RECORDED

SAMPLE #	ITEM	WEIGHT (kg)
1	light bulbs (2)	********
2	transformer	0.200
	light bulbs (3)	0.100
	biodegradable bags (6)	********
		0.2
3	misc scrap from sample	8.700
	light bulbs (2)	********
	biodegradable bags (2)	********
		8.7
4	fertilizer	2.600
	light bulb (1)	********
		2.6
5	roll electrical tape	********
	vacuum bag	1.600
		1.6
6	hair dryer	0.341
	light bulbs (3)	********
		0.341
7	electrical wire	0.273
		0.273
8	transformer	0.183
	rechargeable welder	********
		0.133
9	light bulb (1)	********
10	glass fuse	********
	pool cleaner head	1.544
	rubberbelts	********
		1.544

Town: FERGUS
Enumeration Area: 263 medium income; primarily mixed dwellings
n = 9

SAMPLE #	1 kg	1 % wt	2 kg	2 % wt	3 kg	3 % wt	4 kg	4 % wt	5 kg	5 % wt	6 kg	6 % wt	7 kg	7 % wt	8 kg	8 % wt	9 kg	9 % wt	MEAN (kg)	SE (kg)	MEAN (%)	SE (%)
(1) Paper (a) Newsprint	6.900	7.22%	3.400	3.33%	0.800	0.72%	0.800	0.76%	4.300	0.17%	0.100	8.46%	8.100	7.93%	3.700	2.03%	15.700	15.06%	3.87	1.37	3.94%	1.51%
(b) Fine Paper / CPO / Ledger	3.000	3.77%	0.800	0.78%	3.600	3.20%	3.300	3.13%	1.500	1.06%	4.800	4.46%	0.000	0.94%	0.300	0.24%	0.600	0.58%	2.34	0.89	2.29%	0.83%
(c) Magazines / Flyers	3.500	3.06%	0.012	0.01%	4.800	4.59%			0.100	0.14%	6.700	6.09%							1.91	1.06	1.81%	0.98%
(d) Waxed / Plastic / Mixed	2.400	2.31%	1.300	1.26%	3.000	3.30%	1.800	1.71%	2.400	3.44%	2.400	2.23%	2.300	2.23%	0.800	0.64%	2.300	2.21%	2.18	0.30	2.10%	0.31%
(e) Boxboard	4.200	4.59%	1.300	1.65%	12.700	11.39%	7.700	7.35%	3.900	8.46%	4.800	4.86%	3.700	3.54%	6.800	5.48%	3.600	3.57%	6.12	1.01	6.01%	0.94%
(f) Kraft	2.300	2.41%	0.600	0.58%	6.000	5.39%	4.300	4.08%	1.300	1.72%	1.700	1.58%	4.200	4.11%	1.800	1.45%	1.900	1.83%	2.67	0.50	2.57%	0.53%
(g) Wallpaper			3.300	3.39%	0.100	0.09%													0.60	0.39	0.59%	0.38%
(h) OCC	2.000	2.72%	10.400	10.09%	0.441	0.40%	0.441	0.43%	0.600	1.13%	1.000	1.77%	3.800	3.72%	3.700	2.98%			2.66	1.08	2.58%	1.03%
(i) Tissues	3.000	3.77%	1.700	1.65%	7.800	6.09%	4.000	4.36%	8.400	12.05%	2.400	2.23%	3.000	3.52%	2.000	2.09%	2.000	2.49%	4.14	0.80	4.33%	1.10%
(2) Glass (a) Beer (i) refillable							1.200	1.14%			0.264	0.23%							0.16	0.13	0.15%	0.13%
(ii) non-refillable									0.964	1.38%									0.11	0.11	0.13%	0.15%
(b) Liquor & Wine Containers	1.300	1.36%					4.000	4.63%					2.200	2.13%			2.300	2.21%	1.18	0.37	1.14%	0.54%
(c) Food Containers	6.100	6.48%	0.542	0.53%	2.300	2.00%	2.000	2.75%	2.240	3.21%	1.700	1.58%	3.600	3.29%	4.400	3.54%	4.700	4.51%	3.90	0.77	3.55%	0.79%
(d) SoftDrink (i) refillable																	0.400	0.38%	0.04	0.04	0.04%	0.04%
(ii) non-refillable											1.400	1.30%							0.16	0.16	0.14%	0.14%
(e) Other Containers																						
(f) Plate											0.023	0.02%							0.00	0.00	0.00%	0.00%
(g) Other			1.100	1.07%			2.000	2.75%			0.045	0.04%					2.300	2.21%	0.71	0.38	0.67%	0.36%
(3) Ferrous (a) Soft Drink Containers	0.300	0.31%	1.300	1.26%	0.300	0.27%	0.300	0.47%	0.200	0.20%	0.300	0.46%			0.400	0.33%			0.39	0.13	0.38%	0.13%
(b) Food Containers	1.600	1.67%	1.000	0.97%	1.200	1.08%	3.000	2.94%	1.300	1.72%	1.300	1.15%	2.200	2.13%	1.800	1.45%	2.300	2.40%	1.74	0.33	1.71%	0.22%
(c) Beer Cans (i) returnable																						
(ii) non-returnable																						
(d) Aerosol Cans	2.000	2.09%	0.150	0.15%	0.300	0.27%	1.000	0.95%	0.500	0.72%					0.200	0.16%	0.300	0.29%	0.49	0.21	0.31%	0.30%
(e) Other	0.450	0.47%	3.104	3.01%	0.400	0.36%	2.000	1.90%			1.700	1.58%			1.700	1.37%	1.100	1.06%	1.16	0.35	1.08%	0.35%
(4) Non-Ferrous (a) Beer Cans (i) returnable											0.060	0.05%							0.01	0.01	0.01%	0.01%
(ii) non-returnable					0.700	0.63%	0.200	0.19%	0.018	0.03%							0.100	0.10%	0.11	0.08	0.10%	0.07%
(iii) American																						
(b) Soft Drink Containers													1.200	1.86%					0.19	0.19	0.19%	0.16%
(c) Other Packaging																						
(d) Aluminum	0.100	0.10%	0.100	0.10%	0.400	0.36%	0.600	0.57%	0.700	1.00%	1.000	0.05%			0.100	0.08%	2.300	2.40%	0.61	0.36	0.63%	0.26%
(e) Other			0.268	0.26%							0.100	0.09%							0.04	0.03	0.04%	0.03%
(5) Plastics (a) Polyolefins	6.600	6.91%	3.360	3.77%	7.200	6.46%	8.000	7.30%	7.200	10.33%	6.800	3.86%	5.100	4.99%	5.700	4.30%	3.800	3.94%	6.18	0.46	6.19%	0.87%
(b) PVC									0.200	0.30%	0.500	0.46%					1.100	1.06%	0.20	0.13	0.20%	0.12%
(c) Polystyrene	0.600	0.63%	2.400	2.83%	0.800	0.72%	0.300	0.28%	0.600	0.86%	0.600	0.56%	0.700	0.64%	0.700	0.56%			0.74	0.22	0.74%	0.22%
(d) ABS			0.080	0.08%									0.090	0.09%					0.03	0.01	0.03%	0.01%
(e) PET	0.131	0.14%			0.063	0.06%	0.063	0.06%	0.100	0.14%	0.068	0.06%	0.137	0.13%	0.600	0.48%			0.13	0.06	0.12%	0.05%
(f) Mixed Blend / Coated	0.400	0.42%	0.400	0.29%	0.800	0.72%	0.700	0.06%	0.600	0.86%	0.300	0.29%	0.107	0.10%	0.185	0.15%	1.468	1.41%	0.53	0.14	0.53%	0.14%
(g) Nylon	1.000	1.05%	0.195	0.19%	0.100	0.09%	1.000	0.05%			0.500	0.46%	0.083	0.08%	0.400	0.32%	0.103	0.10%	0.37	0.13	0.36%	0.18%
(h) Vinyl					0.317	0.46%							0.360	0.35%					0.10	0.07	0.09%	0.08%
(6) Organic (a) Food Waste / Rodent Bedding	21.200	22.19%	14.400	13.97%	20.100	18.03%	31.400	29.78%	24.000	35.33%	23.200	21.57%	25.800	25.26%	40.600	22.86%	22.600	21.69%	24.86	2.51	24.40%	2.55%
(b) Yard Waste	20.500	*******	0.350	*******	5.100	*******	3.000	*******	35.300	*******	2.600	*******	7.800	*******	2.100	*******	8.500	*******	8.80	3.53	*******	******
(7) Wood	0.866	0.91%	4.200	4.07%	2.500	2.24%	0.155	0.15%	0.009	0.01%	2.100	1.05%			10.600	8.37%	0.600	0.58%	2.31	1.11	2.05%	0.91%
(8) Ceramics / Rubble / Fiberglass /			19.230	18.65%							4.400	4.00%							2.63	2.13	2.38%	2.07%
Gypsum Board / Asbestos	0.174	0.18%	1.800	1.75%	0.709	0.64%							0.700	0.69%	0.397	0.24%	0.600	0.58%	0.48	0.19	0.45%	0.18%
(9) Diapers	0.144	0.15%	9.600	9.31%	7.000	6.28%	10.600	10.05%					11.300	11.00%	13.700	11.05%	3.000	3.74%	6.38	1.80	5.74%	1.53%
(10) Textiles/Leather/Rubber	9.557	10.00%	5.000	4.85%	0.370	0.33%	0.994	0.94%	2.250	3.26%	10.000	9.46%	7.200	7.05%	15.100	12.16%	17.000	17.19%	7.83	2.06	7.23%	1.86%
(11) Household Hazardous Wastes (a) Paints / Solvents					1.451	1.33%													0.16	0.16	0.14%	0.14%
(b) Waste Oils																						
(c) Pesticides/Herbicides									0.080	0.11%									0.01	0.01	0.01%	0.01%
(12) Dry Cell Batteries	0.166	0.17%									0.064	0.06%					0.003	0.03%	0.08	0.03	0.03%	0.02%
(13) Kitty Litter					10.600	9.68%	2.600	2.47%			8.300	7.73%	7.100	6.95%	5.100	4.11%	4.200	4.05%	4.29	1.35	3.88%	1.21%
(14) Medical Wastes	0.006	0.00%	0.031	0.03%															0.01	0.01	0.01%	0.01%
(15) Miscellaneous			0.041	0.04%	0.086	0.08%	0.076	0.07%											0.03	0.01	0.03%	0.01%
(16) BLUE BOX ITEMS (a) Newsprint	9.150	9.57%	3.000	3.10%	8.600	7.99%	3.500	3.33%	3.150	4.53%	3.500	3.29%	2.300	2.26%	2.450	1.57%	0.550	0.53%	4.07	0.98	4.03%	0.97%
(b) Liquor / Wine Bottles			1.750	1.70%	0.700	0.68%	0.850	0.81%			1.300	1.21%							0.51	0.23	0.48%	0.21%
(c) Food Jars / Other Bottles	1.400	1.46%	3.100	3.01%	0.500	0.45%	1.200	1.14%	0.250	0.36%	1.600	1.67%	0.800	0.78%	0.194	0.16%	1.600	1.63%	1.34	0.31	1.31%	0.35%
(d) Food Cans (i) ferrous	0.600	0.63%	0.630	0.64%			1.100	1.04%			0.350	0.33%	0.523	0.53%	0.090	0.07%	0.300	0.29%	0.36	0.11	0.35%	0.11%
(ii) non-ferrous																						
(e) Beer Cans (i) ferrous	0.060	0.06%			0.300	0.27%	0.230	0.24%									0.100	0.19%	0.06	0.04	0.07%	0.04%
(ii) non-ferrous																						
(iii) American																						
(f) Pop Cans (i) ferrous																						
(ii) non-ferrous	0.530	0.56%	0.400	0.39%	0.800	0.34%	0.490	0.47%	0.250	0.36%	0.300	0.29%	0.190	0.19%	0.166	0.13%	0.500	0.48%	0.38	0.06	0.37%	0.06%
(g) PET Bottles	0.136	0.14%	0.070	0.07%					0.166	0.24%			0.090	0.09%			0.060	0.06%	0.06	0.09	0.07%	0.05%
*** TOTAL BLUE BOX COMPONENTS DIVIDED BY # *** (see Methods & Materials)	95.57 (TOTAL kg)	100.00%	103.11 (TOTAL kg)	99.99%	111.53 (TOTAL kg)	99.29%	100.45 (TOTAL kg)	99.83%	69.72 (TOTAL kg)	100.00%	107.34 (TOTAL kg)	100.00%	102.17 (TOTAL kg)	100.00%	124.16 (TOTAL kg)	100.00%	104.09 (TOTAL kg)	100.03%	102.81		99.98%	

Town: FERGUS
EA: 263 medium income; primarily mixed dwellings

MISCELLANEOUS ITEMS

NOTE: *** = NO WEIGHT RECORDED

SAMPLE #	ITEM	WEIGHT (kg)
1	2 pool chlorine bottles	********
2	vacuum bag	0.041
		0.041
3	light bulb	0.086
		0.086
4	misc. scraps	0.004
	fuse	0.029
	light bulbs	0.049
		0.079
5		
6	lepage cement container	********
7		
8		
9		

APPENDIX B

CITY OF NORTH BAY

APPENDIX B1

CALCULATION OF PER CAPITA WASTE GENERATION RATES FOR STUDY EAs

Town: North Bay
EA: 104 medium income: primarily single detached dwellings
Pop: 1160
Detached: 300
Other: 75
PPD: 3.09

Sample Number	Dwellings with Refuse	Dwellings with Blue Boxes	Sampled Refuse Weight (kg)	Sampled Blue Box Weight (kg)	Daily Weight /Dwelling (kg/day)	Waste /person /day (kg)	S.E.
201	4	0	117.81	0	4.21	1.36	
202	7	0	114.94	0	2.35	0.76	
203	4	0	104.06	0	3.72	1.20	
204	7	0	141.28	0	2.88	0.93	
205	4	0	98.32	0	3.51	1.14	
206	7	0	127.98	0	2.61	0.85	
207	6	0	111.42	0	2.65	0.86	
208	11	0	116.69	0	1.52	0.49	
209	11	0	106.12	0	1.38	0.45	
Sample Avg.	6.8	0.0	115.40	0.00	2.76	0.89	0.103

Town: North Bay
EA: 113 medium income: primarily mixed dwellings
Pop: 860
Detached: 195
Apartments: 35
Other: 125
PPD: 2.42

Sample Number	Dwellings with Refuse	Dwellings with Blue Boxes	Sampled Refuse Weight (kg)	Sampled Blue Box Weight (kg)	Daily Weight /Dwelling (kg/day)	Waste /person /day (kg)	S.E.
211	7	0	101.80	0	2.08	0.86	
213	8	0	97.70	0	1.74	0.72	
214	8	0	138.96	0	2.48	1.03	
216	6	0	119.08	0	2.84	1.17	
217	9	0	99.84	0	1.58	0.65	
218	7	0	129.76	0	2.65	1.09	
219	8	0	94.87	0	1.69	0.70	
212	8	0	126.05	0	2.25	0.93	
215	4	0	105.49	0	3.77	1.56	
Detached Avg.	7.6	0.0	111.7	0.0	2.15		
Other Avg.	6.0	0.0	115.8	0.0	3.01	0.97	0.095

Detached Samples 211,213,214,216-219
Other Dwellings Samples 212,215
*Samples 212,215 used total weight of waste found at the apartment

APPENDIX B2

WASTE COMPOSITION DATA

Ministry of the Environment
Waste Composition Study

GORE & STORRIE LIMITED

Town: North Bay
Enumeration Area: 104 medium income; primarily single detached dwellings
Sample Number 201 – 209
Collection Date , February 21, 1000

MEAN AND STANDARD ERROR ON A WEIGHT BASIS / MEAN AND STANDARD ERROR ON A PERCENT BASIS

SAMPLE #:	1 kg	1 % wt	2 kg	2 % wt	3 kg	3 % wt	4 kg	4 % wt	5 kg	5 % wt	6 kg	6 % wt	7 kg	7 % wt	8 kg	8 % wt	9 kg	9 % wt	MEAN (kg)	SE (kg)	MEAN (%)	SE (%)
(1) Paper (a) Newsprint	10.200	9.09%	9.000	7.84%	12.800	12.30%	6.100	4.46%	7.800	7.96%	13.800	11.07%	11.400	10.23%	16.200	16.13%	21.200	20.13%	12.33	1.62	11.09%	1.57%
(b) Fine Paper / CPO / Ledger	0.900	0.76%	1.500	1.31%	0.400	0.38%	0.900	0.66%	0.600	0.61%	1.100	0.44%	1.100	0.99%	1.300	1.15%	0.900	0.83%	0.97	0.11	0.84%	0.09%
(c) Magazines / Flyers	1.294	1.10%	1.000	1.39%	2.108	2.03%	3.300	2.41%	2.000	2.04%	3.200	2.57%	5.100	4.58%	2.700	2.39%	3.300	3.13%	2.73	0.39	2.80%	0.34%
(d) Waxed / Plastic / Mixed	1.700	1.44%	3.200	2.78%	1.300	1.25%	1.900	1.39%	2.200	2.25%	3.000	2.89%	2.000	1.80%	3.750	3.32%	2.200	2.00%	2.43	0.39	2.15%	0.25%
(e) Boxboard	4.800	3.83%	5.100	4.44%	2.800	2.69%	7.400	5.40%	4.300	4.39%	5.300	4.41%	4.600	4.13%	5.000	4.86%	4.000	4.37%	4.91	0.42	4.27%	0.25%
(f) Kraft	0.700	0.59%	2.000	1.74%	0.400	0.38%	1.200	0.88%	1.700	1.73%	1.800	1.44%	1.200	1.08%	1.000	0.89%	0.700	0.66%	1.21	0.17	1.07%	0.16%
(g) Wallpaper					0.700	0.67%													0.08	0.08	0.07%	0.07%
(h) OCC			2.300	2.00%	2.200	2.11%	3.600	2.84%	0.700	0.71%	5.700	4.57%	9.200	8.26%	2.400	2.13%	1.400	1.32%	3.01	0.94	2.61%	0.82%
(i) Tissues	2.500	2.13%	5.200	4.53%	2.100	2.02%	4.200	3.43%	4.100	4.18%	6.000	4.73%	2.200	1.97%	4.800	4.25%	3.200	3.03%	4.09	0.48	3.39%	0.41%
(2) Glass (a) Beer (i) refillable	3.600	3.06%											1.600	1.44%					0.58	0.44	0.50%	0.36%
(ii) non-refillable																						
(b) Liquor & Wine Containers			1.900	1.66%			2.700	2.13%	1.449	1.48%	2.500	2.01%	0.952	0.85%					1.06	0.39	0.90%	0.31%
(c) Food Containers	8.100	6.88%	5.100	4.44%	2.800	2.69%	5.636	4.12%	3.690	3.77%	3.500	2.81%	2.600	2.33%	5.400	4.78%	5.200	4.84%	4.67	0.34	4.08%	0.47%
(d) SoftDrink (i) refillable									0.900	0.92%									0.10	0.10	0.10%	0.10%
(ii) non-refillable	0.700	0.59%	0.694	0.60%	0.201	0.19%			1.310	1.34%	0.233	0.19%			0.683	0.60%			0.42	0.15	0.39%	0.13%
(e) Other Containers					0.333	0.34%	0.291	0.23%	0.070	0.07%	0.012	0.01%	0.691	0.62%					0.16	0.08	0.14%	0.07%
(f) Plate									0.499	0.51%									0.06	0.06	0.06%	0.06%
(g) Other	0.913	0.78%	0.449	0.39%			0.355	0.28%	0.142	0.14%	0.781	0.63%	0.411	0.37%	0.381	0.34%			0.38	0.11	0.33%	0.09%
(3) Ferrous (a) Soft Drink Containers	0.092	0.08%	1.200	1.05%	0.061	0.06%	2.000	1.46%	0.600	0.61%	1.600	1.28%	0.089	0.08%	0.800	0.71%	1.200	1.14%	0.84	0.24	0.71%	0.15%
(b) Food Containers	3.800	3.23%	7.100	6.18%	2.000	1.92%	4.800	3.51%	4.200	4.29%	3.800	3.05%	9.000	8.10%	8.300	3.76%	4.200	3.95%	4.80	0.56	4.22%	0.50%
(c) Beer Cans (i) returnable																						
(ii) non-returnable																						
(d) Aerosol Cans					0.256	0.25%	0.116	0.09%	0.386	0.39%	0.200	0.17%	0.198	0.18%	0.357	0.32%	0.229	0.21%	0.19	0.05	0.18%	0.04%
(e) Other	0.221	0.19%	2.337	2.03%	1.357	1.30%	7.227	5.29%	0.359	0.37%	0.090	0.07%			1.403	1.24%	0.645	0.62%	1.60	0.74	1.31%	0.54%
(4) Non-Ferrous (a) Beer Cans (i) returnable	0.400	0.34%	0.400	0.35%			0.700	0.51%					0.149	0.13%					0.18	0.09	0.15%	0.07%
(ii) non-returnable	0.300	0.25%																	0.03	0.03	0.03%	0.03%
(iii) American							0.018	0.01%			1.200	0.96%							0.14	0.13	0.11%	0.11%
(b) Soft Drink Containers	0.300	0.25%	0.200	0.17%	0.121	0.12%	0.400	0.29%	0.700	0.71%	0.500	0.40%	0.095	0.09%	0.500	0.44%	1.300	1.14%	0.45	0.11	0.40%	0.11%
(c) Other Packaging	0.016	0.01%							0.011	0.01%	0.003	0.00%			0.012	0.01%			0.00	0.00	0.00%	0.00%
(d) Aluminum	0.200	0.17%	0.200	0.17%	0.200	0.19%	0.200	0.15%	0.100	0.10%	0.400	0.32%	0.300	0.27%	0.200	0.18%	0.200	0.19%	0.22	0.03	0.19%	0.02%
(e) Other			0.563	0.49%			0.279	0.22%							0.057	0.05%	0.074	0.07%	0.11	0.06	0.09%	0.05%
(5) Plastics (a) Polyolefins	4.900	4.16%	7.200	6.27%	3.600	3.46%	7.700	6.06%	5.600	5.71%	6.473	5.19%	4.400	3.92%	7.200	6.38%	7.800	6.95%	6.53	0.48	5.57%	0.37%
(b) PVC							0.031	0.02%	0.050	0.05%	0.126	0.10%			0.152	0.13%	0.359	0.34%	0.08	0.05	0.06%	0.03%
(c) Polystyrene	1.000	0.85%	1.600	1.39%	1.000	0.96%	6.000	4.73%	0.600	0.61%	2.491	2.00%	0.600	0.54%	0.600	0.53%	0.800	0.75%	1.69	0.64	1.38%	0.43%
(d) ABS																						
(e) PET	0.375	0.32%	0.300	0.26%	0.269	0.26%			0.057	0.06%	0.400	0.32%	0.188	0.17%	0.131	0.12%	0.064	0.06%	0.19	0.04	0.16%	0.04%
(f) Mixed Blend/ Layered Plastic	0.700	0.59%	0.700	0.61%	0.400	0.38%	0.700	0.51%	0.700	0.71%	0.050	0.04%	0.700	0.63%	1.000	0.89%	0.500	0.47%	0.60	0.08	0.60%	0.08%
(g) Coated Plastic	0.200	0.17%	0.300	0.26%	0.100	0.10%	0.100	0.07%	0.100	0.10%	0.200	0.16%	0.200	0.18%	0.150	0.13%	0.200	0.19%	0.17	0.03	0.15%	0.02%
(h) Nylon																						
(i) Vinyl	0.221	0.19%	0.069	0.06%	8.644	8.30%	3.072	2.42%	0.398	0.41%			0.015	0.01%					1.40	0.99	1.27%	0.94%
(6) Organic (a) Food Waste / Rodent Bedding	19.300	16.39%	36.200	31.53%	17.400	16.72%	24.800	19.35%	30.800	31.43%	34.100	27.35%	36.000	32.31%	36.700	32.50%	33.000	31.33%	30.00	2.45	26.55%	2.33%
(b) Yard Waste		*******		*******	23.500	*******		*******		*******		*******		*******		*******		*******	2.61	2.61	*******	******
(7) Wood	1.800	1.53%	0.160	0.14%	36.000	34.60%	2.600	2.05%	0.144	0.15%	0.491	0.39%	0.060	0.05%	0.044	0.04%	0.259	0.24%	4.64	3.96	4.35%	3.79%
(8) Ceramics / Rubble / Fiberglass / Gypsum Board / Asbestos	36.100	30.65%	0.477	0.42%	0.118	0.11%	0.475	0.35%	0.591	0.60%	0.103	0.08%	0.179	0.16%	0.785	0.70%			4.98	3.98	3.64%	3.38%
(9) Diapers	4.400	3.74%	10.700	9.32%	0.208	0.20%	7.600	5.99%	14.100	14.39%	13.500	10.83%	13.000	11.67%			0.198	0.19%	7.08	2.01	6.21%	1.85%
(10) Textiles/Leather/Rubber	6.800	5.77%	2.500	2.18%	1.200	1.15%	14.710	10.74%	7.000	7.14%	1.900	1.52%	2.239	2.01%			7.800	7.41%	4.91	1.50	4.21%	1.32%
(11) Household Hazardous (a) Paints / Solvents			3.800	3.31%							0.756	0.61%	0.094	0.08%					0.51	0.42	0.44%	0.37%
Wastes (b) Waste Oils	0.103	0.09%																	0.01	0.01	0.01%	0.01%
(c) Pesticides/Herbicides																						
(12) Dry Cell Batteries							0.182	0.13%			0.349	0.28%							0.06	0.04	0.03%	0.03%
(13) Kitty Litter	1.200	1.02%			2.400	2.31%	4.000	2.93%			3.600	2.89%	0.075	0.07%					1.25	0.55	1.02%	0.44%
(14) Medical Waste			0.094	0.08%									0.107	0.10%	0.317	0.44%	0.121	0.11%	0.07	0.04	0.06%	0.06%
(15) Miscellaneous	0.090	0.08%	0.700	0.61%			4.627	3.36%	0.334	0.34%	3.329	2.67%	0.756	0.68%	3.834	3.39%	0.389	0.37%	1.53	0.61	1.27%	0.48%
(16) Ashes							3.700	2.70%							6.000	5.31%	1.900	1.80%	1.39	0.75	1.09%	0.62%
	117.79	100.00%	114.80	100.00%	104.06	100.00%	126.94	100.00%	97.99	100.00%	124.69	100.00%	111.41	100.00%	112.91	100.00%	106.32	100.00%	113.96		99.75%	
	TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg					

EA 104 medium income; primarily single detached dwellings

MISCELLANEOUS ITEMS

NOTE: *** = NO WEIGHT RECORDED

SAMPLE #	ITEM	WEIGHT (kg)
1	light bulbs = 2	*********
	electrical wire	0.090
		0.090
2	light bulbs = 2	*********
	vaccum bag dust	0.700
		0.700
3	light bulbs = 1	*********
4	sewing machine (metal)	3.700
	electric motor	0.200
	vaccum bag dust	0.600
	electrical wire	0.029
	scissors (plastic/metal)	0.061
	electrical fuses	0.033
	light bulbs = 6	*********
		4.627
5	light bulbs = 3	*********
	vaccum bag dust	0.834
		0.334
6	vaccum bag dust	3.000
	paint brush (wood/hair)	0.049
	golf balls	0.099
	electrical fuses	0.034
	copper pennies	0.136
	magic markers	0.013
		3.329
7	"Comet","Ajax" cleaners	0.393
	vaccum bag dust	0.019
	light switches (ABS & metal)	0.350
	light bulbs = 4	
		0.756
8	vaccum bag dust	0.290
	electronic components	0.329
	record player	3.000
	light bulbs = 2	*********
		3.634
9	light bulbs = 3	*********
	vaccum bag dust	0.219
	clock (plastic)	0.100
	electrical wire	0.070
		0.389

Ministry of the Environment
Waste Composition Study

GORE & STORRIE LIMITED

Town: North Bay
Enumeration Area: 115 medium income; primarily mixed dwellings
Sample Number: 211 - 219
Collection Date: February 27, 1990

SAMPLE #	1 kg	1 % wt	2 kg	2 % wt	3 kg	3 % wt	4 kg	4 % wt	5 kg	5 % wt
(1) Paper (a) Newsprint	17.900	17.46%	24.000	19.12%	8.000	9.29%	4.300	4.11%	13.900	13.90%
(b) Fine Paper / CPO / Ledger	0.000	0.88%	19.000	15.14%	1.100	1.19%	0.000	0.82%	1.300	1.23%
(c) Magazines / Flyers	3.200	3.14%	10.000	8.08%	2.000	2.61%	0.700	0.64%	0.500	0.36%
(d) Waxed / Plastic / Mixed	1.900	1.87%	3.000	2.32%	2.491	2.02%	0.800	0.75%	2.000	1.96%
(e) Boxboard	3.300	3.24%	4.900	3.00%	2.600	2.91%	2.000	1.43%	4.100	4.03%
(f) Kraft	0.800	0.79%	1.500	1.20%	0.500	0.54%	0.000	0.55%	1.000	0.98%
(g) Wallpaper	2.700	2.65%	0.013	0.01%						
(h) OCC	1.800	1.77%	2.300	1.83%	4.500	4.86%	5.300	4.84%	1.300	1.28%
(i) Tissues	4.300	4.43%	3.400	2.71%	4.300	4.64%	1.500	1.37%	3.000	3.88%
(2) Glass (a) Beer (i) refillable										
(ii) non-refillable					0.800	0.97%				
(b) Liquor & Wine Containers	1.900	1.87%	3.400	2.71%	0.008	0.83%	0.500	0.46%	8.700	8.53%
(c) Food Containers	1.000	1.87%	4.400	3.51%	3.000	3.98%	2.000	1.83%	2.000	1.35%
(d) Soft Drink (i) refillable			0.200	0.36%						
(ii) non-refillable	1.300	1.28%	0.700	0.56%						
(e) Other Containers			0.063	0.05%	0.459	0.30%				
(f) Plate					0.200	0.22%	0.181	0.17%		
(g) Other			1.187	0.03%	0.277	0.20%	0.225	0.21%	0.256	0.23%
(3) Ferrous (a) Soft Drink Containers	1.900	1.87%	0.300	0.24%	0.000	0.07%			0.400	0.29%
(b) Food Containers	2.100	2.08%	4.100	3.27%	1.000	2.05%	1.700	1.83%	4.300	4.22%
(c) Beer Cans (i) returnable										
(ii) non-returnable										
(d) Aerosol Cans	0.366	0.98%	0.200	0.40%	0.200	0.22%	0.173	0.16%	0.091	0.02%
(e) Other	0.000	0.03%	0.300	0.40%	2.200	2.37%	5.089	4.65%	0.058	0.06%
(4) Non-Ferrous (a) Beer Cans (i) returnable	1.400	1.98%			0.900	0.97%				
(ii) non-returnable										
(iii) American									0.041	0.04%
(b) Soft Drink Containers			0.300	0.40%	0.300	0.32%	0.108	0.10%	0.030	0.03%
(c) Other Packaging					0.007	0.01%			0.001	0.03%
(d) Aluminum	0.111	0.11%	0.300	0.24%	0.300	0.32%	0.077	0.07%	0.200	0.20%
(e) Other					0.354	0.38%	0.312	0.29%	0.220	0.22%
(5) Plastics (a) Polyolefins	4.300	4.22%	0.900	3.40%	5.700	6.16%	1.780	1.61%	3.800	3.23%
(b) PVC	0.265	0.26%			0.211	0.23%	0.164	0.15%	0.136	0.13%
(c) Polystyrene	0.660	0.64%	1.400	1.12%	2.062	2.22%	1.400	1.28%	1.281	1.26%
(d) ABS							0.900	0.82%		
(e) PET	0.250	0.23%	0.800	0.64%	0.063	0.07%				
(f) Mixed Blend/ Layered Plastic	0.700	0.06%	0.500	0.40%	0.200	0.22%	0.400	0.37%	0.700	0.69%
(g) Coated Plastic	0.082	0.08%	0.200	0.16%	0.100	0.11%	0.001	0.03%	0.215	0.21%
(h) Nylon										
(i) Vinyl	0.200	0.49%			2.000	2.16%	5.400	4.03%		
(6) Organic (a) Food Waste / Rodent Bedding	37.400	36.74%	24.200	19.26%	21.590	23.29%	7.400	6.76%	34.200	33.83%
(b) Yard Waste		*******		*******		*******		*******		*******
(7) Wood	4.100	4.03%	0.300	0.40%	1.200	1.29%	18.919	17.29%	0.043	0.04%
(8) Ceramics / Rubble / Fiberglass / Gypsum Board / Asbestos	0.824	0.81%	0.200	0.16%	0.375	0.41%			0.858	0.84%
(9) Diapers							1.300	1.35%		
(10) Textiles/Leather/Rubber	1.200	1.18%	4.200	3.33%	9.000	9.71%	14.700	13.43%	0.448	0.44%
(11) Household Hazardous Wastes (a) Paints / Solvents			0.500	0.40%					0.094	0.09%
(b) Waste Oils										
(c) Pesticides/Herbicides					0.155	0.17%				
(12) Dry Cell Batteries			0.036	0.03%	0.018	0.02%	0.008	0.01%	0.016	0.02%
(13) Kitty Litter	3.400	3.34%			4.700	5.07%			4.100	4.03%
(14) Medical Wastes					0.164	0.18%	0.177	0.16%	0.040	0.04%
(15) Miscellaneous			0.532	0.48%	5.366	5.79%	29.822	27.23%	3.783	3.88%
(16) Ashes										
	101.86	100.00%	125.59	100.00%	92.68	100.00%	109.46	100.00%	101.94	100.00%
	TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg	

SAMPLE #	6 kg	6 % wt	7 kg	7 % wt	8 kg	8 % wt	9 kg	9 % wt	MEAN (kg)	SE (kg)	MEAN (%)	SE (%)
									MEAN AND STANDARD ERROR ON A WEIGHT BASIS		MEAN AND STANDARD ERROR ON A PERCENT BASIS	
(1) Paper (a) Newsprint	7.700	8.47%	6.900	6.91%	6.900	5.33%	3.700	8.13%	10.87	3.23	10.03%	1.91%
(b) Fine Paper / CPO / Ledger	1.400	1.16%	1.400	1.40%	1.300	1.16%	0.000	0.87%	3.16	1.08	2.87%	1.36%
(c) Magazines / Flyers	9.300	3.46%	1.900	1.90%	3.000	3.86%	1.000	2.05%	4.36	1.07	3.84%	0.64%
(d) Waxed / Plastic / Mixed	2.200	1.83%	2.000	2.00%	2.000	1.54%	2.000	2.91%	2.21	0.22	2.08%	0.23%
(e) Boxboard	4.800	4.03%	3.900	3.91%	8.100	6.26%	3.300	3.04%	4.57	0.60	4.20%	0.51%
(f) Kraft	2.900	1.65%	1.300	1.20%	2.300	1.82%	1.300	1.40%	1.30	0.23	1.17%	0.17%
(g) Wallpaper							8.000	8.29%	1.26	0.86	1.33%	1.04%
(h) OCC	1.100	0.80%	7.100	7.11%	2.000	1.54%	2.700	2.03%	3.12	0.68	3.01%	0.71%
(i) Tissues	4.400	3.84%	4.200	4.21%	3.900	2.78%	4.900	3.18%	3.94	0.33	3.03%	0.38%
(2) Glass (a) Beer (i) refillable					0.310	0.92%			0.06	0.06	0.08%	0.04%
(ii) non-refillable									0.10	0.10	0.17%	0.11%
(b) Liquor & Wine Containers	0.900	0.20%	2.400	2.40%	8.300	4.87%	0.000	0.03%	2.78	0.97	2.32%	0.89%
(c) Food Containers	7.300	0.50%	3.400	3.41%	4.400	3.40%	1.900	2.05%	3.46	0.63	3.13%	0.48%
(d) Soft Drink (i) refillable									0.08	0.06	0.00%	0.03%
(ii) non-refillable	0.600	0.50%	0.700	0.70%	0.255	0.18%	1.200	1.30%	0.53	0.17	0.50%	0.17%
(e) Other Containers	0.400	0.34%	0.759	0.76%	0.131	0.12%			0.20	0.09	0.20%	0.09%
(f) Plate							0.388	0.36%	0.08	0.04	0.08%	0.03%
(g) Other			1.000	1.00%	1.300	1.00%	1.400	1.51%	0.62	0.19	0.38%	0.18%
(3) Ferrous (a) Soft Drink Containers	1.200	1.01%	1.300	1.30%	2.000	1.34%	0.200	0.22%	0.91	0.25	0.84%	0.22%
(b) Food Containers	3.000	2.32%	4.500	4.31%	4.100	3.17%	3.700	3.00%	3.24	0.35	3.02%	0.34%
(c) Beer Cans (i) returnable												
(ii) non-returnable												
(d) Aerosol Cans	0.133	0.11%	0.194	0.19%	0.289	0.22%	0.097	0.10%	0.23	0.05	0.21%	0.04%
(e) Other	0.168	0.12%	0.300	0.30%	8.797	6.79%	0.094	0.10%	1.65	1.09	1.57%	0.82%
(4) Non-Ferrous (a) Beer Cans (i) returnable			0.400	0.40%	0.286	0.22%	0.200	0.22%	0.35	0.16	0.83%	0.17%
(ii) non-returnable												
(iii) American			0.086	0.08%	0.041	0.03%			0.09	0.01	0.02%	0.01%
(b) Soft Drink Containers	0.181	0.11%	0.200	0.20%	0.800	0.22%	0.300	0.84%	0.23	0.08	0.31%	0.08%
(c) Other Packaging	0.018	0.01%	0.000	0.04%			0.037	0.04%	0.02	0.01	0.02%	0.01%
(d) Aluminum	0.800	0.17%	0.077	0.08%	0.178	0.14%	0.800	0.32%	0.19	0.06	0.18%	0.03%
(e) Other					0.400	0.33%			0.13	0.06	0.16%	0.08%
(5) Plastics (a) Polyolefins	4.800	4.03%	5.300	5.51%	7.300	5.84%	4.255	4.59%	4.89	0.53	4.82%	0.40%
(b) PVC			0.046	0.05%			0.149	0.16%	0.11	0.00	0.11%	0.03%
(c) Polystyrene	1.310	1.10%	1.100	1.10%	1.900	1.47%	1.374	1.48%	1.41	0.12	1.32%	0.13%
(d) ABS	0.159	0.13%			0.008	0.03%	0.046	0.03%	0.13	0.10	0.11%	0.08%
(e) PET	0.009	0.05%	0.133	0.18%			0.800	0.86%	0.23	0.11	0.22%	0.11%
(f) Mixed Blend/ Layered Plastic	0.700	0.59%	0.700	0.70%	0.200	0.54%	0.700	0.79%	0.59	0.06	0.53%	0.08%
(g) Coated Plastic	0.400	0.34%	0.200	0.20%	0.800	0.27%	0.200	0.22%	0.19	0.04	0.17%	0.03%
(h) Nylon												
(i) Vinyl									0.88	0.61	0.94%	0.56%
(6) Organic (a) Food Waste / Rodent Bedding	33.200	29.56%	33.000	33.65%	38.800	29.42%	17.700	18.11%	27.57	3.46	25.60%	3.18%
(b) Yard Waste		*******		*******		*******		*******			*******	******
(7) Wood	0.008	0.01%	2.000	2.00%	2.800	2.16%	0.043	0.03%	3.29	2.01	3.02%	1.44%
(8) Ceramics / Rubble / Fiberglass / Gypsum Board / Asbestos			0.300	0.30%	4.700	3.63%			0.81	0.30	0.08%	0.96%
(9) Diapers	24.900	20.91%	4.100	4.11%	2.300	1.03%	3.300	3.84%	4.30	2.66	3.63%	2.25%
(10) Textiles/Leather/Rubber	2.300	1.93%	4.300	4.91%	8.424	6.51%	1.600	1.79%	5.15	1.57	4.73%	1.46%
(11) Household Hazardous Wastes (a) Paints / Solvents			0.800	0.60%	2.373	1.83%			0.42	0.08	0.83%	0.81%
(b) Waste Oils												
(c) Pesticides/Herbicides									0.09	0.09	0.08%	0.09%
(12) Dry Cell Batteries	0.176	0.14%	0.083	0.08%					0.04	0.03	0.03%	0.02%
(13) Kitty Litter	4.700	3.93%					9.000	10.37%	2.94	1.10	2.97%	1.18%
(14) Medical Wastes	0.156	0.16%					0.099	0.08%	0.06	0.06	0.06%	0.06%
(15) Miscellaneous			0.432	0.47%	0.719	0.38%	2.253	2.43%	4.77	3.19	4.51%	2.83%
(16) Ashes							3.900	4.10%	0.48	0.42	0.46%	0.46%
	119.06	100.00%	99.94	100.00%	129.46	100.00%	92.83	100.00%	108.05		100.00%	
	TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg					

MISCELLANEOUS ITEMS

NOTE: *** = NO WEIGHT RECORDED

SAMPLE #	ITEM	WEIGHT (kg)
1	light bulbs - 2	*********
2	vaccum bag dust	0.200
	electronic circuits	0.300
	magic markers	0.032
	light bulbs - 4	*********
		0.582
3	light bulbs - 7	*********
	electric food blender	2.900
	humidifier (plastic/metal)	1.200
	3-ring binder	0.312
	vaccum bag dust	0.254
	picture frame (metal/glass)	0.800
		5.366
4	books	24.300
	3-ring binders	2.400
	food thermos	0.300
	brass plumbing	2.800
	electrical fuse	0.022
	light bulbs - 3	*********
		29.822
5	light bulbs - 8	*********
	vaccum bag dust	0.018
	clock (plastic)	0.425
	electrical fuse	0.081
	photo albums	3.300
		3.783
6		
7	light bulbs - 9	*********
	charcoal filter	0.432
		0.432
8	light bulbs - 8	*********
	vaccum bag dust	0.719
		0.719
9	light bulbs - 4	*********
	plant brush (wood/hair)	0.159
	electric hot plate	0.400
	vaccum bag dust	1.700
		2.253

APPENDIX C

BOROUGH OF EAST YORK

APPENDIX C1

CALCULATION OF PER CAPITA WASTE GENERATION RATES FOR STUDY EAs

Town: East York
EA: 05-213 medium income: primarily mixed dwellings
Pop: 975
Detached: 150
Other: 210
PPD: 2.71

Sample Number	Dwellings with Refuse	Dwellings with Blue Boxes	Sampled Refuse Weight (kg)	Sampled Blue Box Weight (kg)	Daily Weight /Dwelling (kg/day)	Waste /person /day (kg)	S.E.
121	10	4	146.01	94.12	3.77	1.390	
122	7	7	111.43	52.30	2.81	1.036	
123	5	0	124.00	0.00	3.54	1.307	
124	7	4	116.36	38.50	3.06	1.130	
125	7	5	119.88	37.00	2.98	1.098	
126	8	6	137.83	39.70	2.93	1.083	
127	5	3	92.57	31.20	3.39	1.250	
129	11	0	160.48	0.00	2.08	0.769	
128	10	10	146.40	16.80	2.24	0.827	
Detached Avg.	7.5	3.6	126.07	36.60	3.07		
Other Avg.	10	10	148.40	16.80	2.24	1.10	0.069

Detached: Samples 121-127, 129
Other Dwellings: Samples 128

***Sample 128 assumed all units in Apartment building contributed to the Blue Box weight recorded.**

Town: East York
EA: 05-303 low income: primarily mixed dwellings
Pop: 675
Dwellings: 235
PPD: 2.87

Sample Number	Dwellings with Refuse	Dwellings with Blue Boxes	Sampled Refuse Weight (kg)	Sampled Blue Box Weight (kg)	Daily Weight /Dwelling (kg/day)	Waste /person /day (kg)	S.E.
131	6	3	95.94	11.37	2.56	0.890	
132	7	2	116.84	18.36	3.04	1.059	
133	6	5	118.27	43.47	3.44	1.198	
134	7	3	84.81	8.00	1.92	0.669	
135	missing data						
136	6	4	108.70	33.39	3.18	1.110	
137	7	3	98.18	33.48	2.80	0.976	
138	6	3	117.35	13.93	3.13	1.089	
139	missing data						
Sample Avg.	6.4	3.3	105.73	23.14	2.87	1.00	0.066

Town: East York
EA: 65-603 high income: primarily single detached
Pop: 600
Dwellings: 340
PPD: 2.50

Sample Number	Dwellings with Refuse	Dwellings with Blue Boxes	Sampled Refuse Weight (kg)	Sampled Blue Box Weight (kg)	Daily Weight /Dwelling (kg/day)	Waste /person /day (kg)	S.E.
101	8	7	118.60	85.62	2.99	1.197	
102	7	6	135.56	69.96	3.60	1.440	
103	7	4	110.42	42.96	3.02	1.208	
104	7	6	127.81	49.11	3.19	1.277	
105	8	7	163.99	67.20	3.61	1.446	
106	6	5	122.95	53.95	3.70	1.479	
107	6	6	95.32	48.34	2.85	1.138	
108	5	2	108.15	12.04	3.52	1.408	
109	9	8	113.53	76.85	2.57	1.027	
Sample Avg.	7.0	5.7	122.37	56.23	3.23	1.29	0.053

Town: East York
EA: 12-055 medium income: primarily multiple dwellings
Pop: 735
Dwellings: 474
PPD: 1.55

Sample Number	Dwellings with Refuse	Dwellings with Blue Boxes	Sampled Refuse Weight (kg)	Sampled Blue Box Weight (kg)	Daily Weight /Dwelling (kg/day)	Waste /person /day (kg)	S.E.
111-119	474	0	5338.90	0.00	1.61	1.04	NA

Town: East York
EA: 90-168 medium income: primarily single detached
Pop: 935
Dwellings: 375
PPD: 2.49

Sample Number	Dwellings with Refuse	Dwellings with Blue Boxes	Sampled Refuse Weight (kg)	Sampled Blue Box Weight (kg)	Daily Weight /Dwelling (kg/day)	Waste /person /day (kg)	S.E.
141	7	5	93.93	45.30	2.56	1.03	
142	6	2	81.23	28.45	2.95	1.18	
143	6	2	109.00	7.90	2.88	1.16	
144	4	3	91.57	16.87	3.67	1.47	
145	4	4	60.04	41.23	2.88	1.16	
146	6	4	117.52	19.69	3.15	1.26	
147	11	8	112.78	67.52	2.07	0.83	
148	4	2	81.26	22.06	3.69	1.48	
149	9	5	113.13	38.07	2.34	0.94	
Sample Avg.	6.3	3.9	95.61	31.91	2.91	1.17	0.073

Town: East York
EA: 90-117 high income: mixed dwellings
Pop: 805
Detached: 175
Other: 150
PPD: 2.48

Sample Number	Dwellings with Refuse	Dwellings with Blue Boxes	Sampled Refuse Weight (kg)	Sampled Blue Box Weight (kg)	Daily Weight /Dwelling (kg/day)	Waste /person /day (kg)	S.E.
151	8	5	106.18	29.23	2.31	0.93	
152	4	2	84.31	9.99	3.37	1.36	
153	11	7	115.60	49.70	2.01	0.81	
154	8	4	94.23	43.89	2.47	0.99	
155	9	6	128.66	40.42	2.52	1.02	
156	13	7	97.79	52.40	1.61	0.65	
157	12	8	106.80	66.66	1.87	0.75	
158	16	16	102.13	49.99	1.14	0.46	
159	13	0	104.05	0.00	1.14	0.46	
Detached Avg.	8.8	5.2	104.46	37.60	2.38		
Other Avg.	14.0	12.0	104.47	58.32	1.50	0.83	0.096

Detached Samples 151-157
Other Dwellings Samples 158, 159

*Samples 158, 159 used total weight of waste found at the apartment
*Sample 158 assumed all units in Apartment building contributed to the Blue Box weight recorded.

Town: East York
EA: 90-055 low income: primarily multiple dwellings
Pop: 453
Dwellings: 259
PPD: 1.75

Sample Number	Dwellings with Refuse	Dwellings with Blue Boxes	Sampled Refuse Weight (kg)	Sampled Blue Box Weight (kg)	Daily Weight /Dwelling (kg/day)	Waste /person /day (kg)	S.E.
161-169	259	0	2364.60	0.00	1.30	0.75	

Town: East York - Christmas Collection
EA: 90-117 high income: mixed dwellings
Pop: 805
Detached: 175
Other: 150
PPD: 2.48

Sample Number	Dwellings with Refuse	Dwellings with Blue Boxes	Collected Refuse Weight (kg)	Sampled Blue Box Weight (kg)	Daily Weight /Dwelling (kg/day)	Waste /person /day (kg)	S.E.
181	9	0	114.30	0	2.12	0.853	
182	8	0	116.90	0	2.44	0.982	
183	7	0	93.10	0	2.22	0.894	
184	9	0	123.60	0	2.29	0.923	
185	10	0	103.30	0	1.72	0.694	
186	11	0	135.20	0	2.05	0.826	
187	6	0	91.70	0	2.55	1.027	
188	16	0	206.60	0	2.15	0.868	
189	13	0	245.00	0	3.14	1.267	
Detached Avg.	8.6	0.0	111.16	0.00	2.20		
Other Avg.	14.5	0.0	225.80	0.00	2.65	0.93	0.053

Detached Samples 181-187
Other Dwellings Samples 188,189

*Collected weights do not match sample weights of sorted refuse because field crew did not have scale with them during collection. Samples were reweighed at sorting site, and excess materials (+ 100 kg) were discarded.

*Samples 158, 159 used total weight of waste found at the apartment
*Number of days between collection days was six (6) weeks due to the City rescheduling collections over the Christmas Holiday.
*No Blue Box collection over Christmas Holiday

Town: East York
EA: Schools

Sample number	School Category	Daily weight (kg)	Students and Staff	Waste /person /day (kg)
1	Primary	39.77	230	0.173
2	Jr. High	67.72	414	0.164
3	Primary	30.59	224	0.136
4	Jr. High	72.22	339	0.213
5	Primary	40.23	393	0.102
6	Primary	29.57	351	0.084
7	Sr. High	190.84	1180	0.162

APPENDIX C2

WASTE COMPOSITION DATA

Ministry of the Environment
Waste Composition Study

GORE & STORRIE LIMITED

Town: EAST YORK
Enumeration Area: 06 – 215 medium income; primarily mixed dwellings
n = 121 – 129
Collection Date: Tuesday November 7
Thursday November 9

SAMPLE #:	1		2		3		4		5		6		7		8		9		MEAN AND STANDARD ERROR ON A WEIGHT BASIS		MEAN AND STANDARD ERROR ON A PERCENT BASIS	
	kg	% wt	kg	% wt	kg	% wt	kg	% wt	kg	% wt	kg	% wt	kg	% wt	kg	% wt	kg	% wt	MEAN (kg)	SE (kg)	MEAN (%)	SE (%)
(1) Paper (a) Newsprint	15.100	7.82%	5.000	3.83%	15.600	11.36%	9.000	6.04%	14.300	10.55%	4.700	2.99%	5.300	4.91%	16.900	15.11%	8.700	5.62%	10.29	1.59	7.62%	1.34%
(b) Fine Paper / CPO / Ledger	1.600	0.83%	2.400	1.75%	1.100	0.96%	2.300	1.85%	1.900	1.38%	2.200	1.40%	2.400	2.22%	2.200	1.97%	1.700	1.10%	2.00	0.15	1.49%	0.18%
(c) Magazines / Flyers	4.700	2.43%	18.759	13.68%	5.700	3.70%	1.300	1.11%	4.400	3.18%	5.400	3.47%	3.800	3.52%	7.900	7.06%	5.300	3.42%	6.30	1.65	4.94%	1.32%
(d) Waxed / Plastic / Mixed	3.600	1.86%	3.800	2.77%	2.600	2.21%	2.000	2.14%	3.200	2.59%	8.100	5.19%	1.400	1.30%	1.700	1.52%	6.400	4.19%	3.74	0.79	2.60%	0.42%
(e) Boxboard	4.200	2.18%	4.600	3.53%	8.000	7.32%	6.300	4.63%	3.300	3.08%	3.211	2.04%	4.300	4.17%	4.600	4.20%	7.600	4.91%	5.43	0.58	4.10%	0.33%
(f) Kraft	4.900	2.34%	0.705	0.51%	1.000	0.85%	1.700	1.25%	1.300	0.94%	0.400	0.31%	1.300	1.21%	1.000	0.39%	1.100	0.71%	1.50	0.44	1.02%	0.21%
(g) Wallpaper																	0.700	0.43%	0.08	0.08	0.05%	0.05%
(h) OCC	2.600	1.35%	0.807	0.94%	0.992	0.33%	3.300	2.36%	1.033	0.73%	4.100	2.02%	8.600	7.97%	1.600	1.51%	7.600	5.04%	3.36	0.90	2.57%	0.83%
(i) Tissues	5.600	3.00%	5.300	3.87%	4.100	3.49%	7.000	5.17%	0.600	4.02%	11.000	6.98%	5.300	3.94%	5.600	3.22%	6.900	4.20%	5.06	0.77	4.32%	0.43%
(2) Glass (a) Beer (i) refillable											0.894	0.92%			0.997	0.26%			0.06	0.05	0.06%	0.04%
(ii) non-refillable																						
(b) Liquor & Wine Containers	2.300	1.20%			1.100	0.94%	13.000	9.39%							3.300	3.17%	1.301	0.94%	2.58	1.39	1.72%	1.06%
(c) Food Containers	2.155	1.12%	1.752	1.38%	3.000	2.58%	2.273	1.68%	2.766	2.02%	1.413	0.90%	0.064	0.09%	1.700	1.32%	2.048	1.62%	2.07	0.22	1.38%	0.18%
(d) Soft Drink (i) refillable	0.351	0.17%	0.386	0.29%					2.064	1.48%									0.31	0.22	0.27%	0.16%
(ii) non-refillable	2.200	1.14%			0.400	0.38%	0.473	0.53%			0.798	0.30%			0.883	0.79%	0.209	0.14%	0.56	0.39	0.57%	0.13%
(e) Other Containers	0.162	0.09%					0.266	0.26%					0.108	0.10%	0.240	0.21%	0.255	0.16%	0.12	0.04	0.09%	0.03%
(f) Plate																	2.300	1.61%	0.28	0.29	0.18%	0.18%
(g) Other	0.445	0.32%	0.636	0.46%	0.834	0.71%	0.361	0.27%	1.403	1.02%	1.398	0.88%	0.157	0.13%			2.308	1.49%	0.85	0.25	0.38%	0.16%
(3) Ferrous (a) Soft Drink Containers			0.032	0.02%	0.000	0.05%	0.200	0.15%	0.727	0.33%	0.000	0.57%			0.160	0.13%	0.000	0.04%	0.24	0.11	0.16%	0.07%
(b) Food Containers	2.500	1.29%	1.200	0.88%	0.862	0.72%	1.900	1.60%	1.000	1.36%	1.105	0.70%	0.800	0.74%	2.600	2.30%	3.000	1.04%	1.78	0.28	1.26%	0.21%
(c) Beer Cans (i) returnable																						
(ii) non-returnable																						
(d) Aerosol Cans					0.464	0.60%	0.224	0.17%	0.214	0.15%	0.008	0.02%			0.111	0.19%			0.18	0.05	0.09%	0.04%
(e) Other	2.307	1.18%	0.033	0.02%	0.657	0.36%	0.351	0.24%			0.761	0.50%	6.139	3.88%	0.007	0.01%	0.600	0.53%	1.23	0.66	0.07%	0.00%
(4) Non-Ferrous (a) Beer Cans (i) returnable					0.173	0.15%	0.091	0.02%	0.250	0.18%					0.400	0.36%	0.017	0.01%	0.10	0.06	0.08%	0.04%
(ii) non-returnable							0.116	0.06%											0.01	0.01	0.01%	0.01%
(iii) American	0.083	0.04%			0.043	0.04%	0.200	0.15%											0.04	0.03	0.02%	0.02%
(b) Soft Drink Containers	0.200	0.10%	0.130	0.11%	0.217	0.18%	0.200	0.15%	0.014	0.01%	0.900	0.57%			0.868	0.78%	0.154	0.09%	0.30	0.11	0.22%	0.09%
(c) Other Packaging									0.086	0.00%					0.094	0.00%			0.01	0.01	0.01%	0.01%
(d) Aluminum	0.700	0.36%	0.158	0.12%	0.600	0.51%	0.540	0.40%	0.559	0.40%	3.084	1.94%	0.047	0.04%	0.168	0.13%	0.409	0.36%	0.89	0.31	0.46%	0.19%
(e) Other					0.570	0.49%											0.590	0.38%	0.11	0.07	0.08%	0.05%
(5) Plastics (a) Polyolefins	6.600	3.53%	5.200	3.79%	6.300	5.36%	6.300	4.05%	7.769	5.83%	8.029	5.11%	5.400	5.44%	6.200	5.54%	8.389	5.38%	6.66	0.34	4.61%	0.34%
(b) PVC					0.065	0.05%			0.053	0.05%	0.040	0.02%	0.008	0.00%	0.176	0.16%	0.152	0.10%	0.06	0.02	0.03%	0.02%
(c) Polystyrene	0.898	0.46%	0.508	0.37%	0.736	0.63%	0.834	0.60%	0.710	0.51%	0.800	0.51%	0.889	0.83%	1.649	1.47%	1.500	0.97%	0.96	0.12	0.72%	0.11%
(d) ABS	0.053	0.03%			0.043	0.04%											0.083	0.05%	0.02	0.01	0.01%	0.01%
(e) PET	0.127	0.07%			0.062	0.05%			0.208	0.15%	0.245	0.15%			0.437	0.39%	0.146	0.09%	0.14	0.05	0.10%	0.04%
(f) Mixed Blend Plastic	0.400	0.21%	0.400	0.29%	0.600	0.51%	0.500	0.37%	0.700	0.51%	1.000	0.63%	0.400	0.37%	0.800	0.72%	0.600	0.39%	0.63	0.06	0.47%	0.06%
(g) Coated Plastic	0.100	0.05%	0.116	0.09%	0.120	0.10%	0.220	0.16%	0.214	0.15%	0.400	0.25%	0.111	0.10%	0.200	0.18%	0.816	0.53%	0.27	0.08	0.19%	0.05%
(h) Nylon																						
(i) Vinyl																						
(6) Organic (a) Food Waste / Rodent Bedding	53.578	27.92%	41.910	30.56%	45.829	39.05%	45.400	33.51%	57.327	41.99%	61.300	38.98%	45.100	41.80%	30.500	27.27%	45.000	29.06%	47.06	3.09	34.23%	2.04%
(b) Yard Waste	45.600	******	18.500	******	1.700	******	10.100	******		******	8.400	******	13.000	******		******	10.400	******	11.79	4.71	******	******
(7) Wood	0.095	0.05%	0.438	0.32%	0.298	0.25%	0.128	0.09%	0.090	0.07%	1.020	0.65%	1.403	1.30%	0.139	0.12%	8.469	5.47%	1.34	0.90	0.82%	0.58%
(8) Ceramics / Rubble / Fiberglass / Gypsum Board / Asbestos	3.941	1.89%	0.190	0.14%	0.514	0.44%	0.100	0.07%									2.106	1.36%	0.73	0.43	0.45%	0.23%
(9) Diapers	12.300	6.37%	10.400	7.58%	2.600	2.21%	5.300	3.91%	2.800	2.05%	6.074	3.50%	0.200	0.19%	5.000	4.47%	0.700	4.52%	6.00	1.31	4.07%	0.77%
(10) Textiles/Leather/Rubber	2.683	1.40%	4.748	3.46%	5.153	4.39%	3.004	2.22%	1.066	0.77%	4.379	2.79%	0.706	0.65%	2.292	2.02%	10.600	6.82%	3.85	0.99	2.71%	0.66%
(11) Household Hazardous Wastes (a) Paints / Solvents			0.574	0.42%									0.473	0.44%	1.144	1.02%			0.24	0.14	0.21%	0.12%
(b) Waste Oils																	3.600	2.32%	0.40	0.40	0.26%	0.26%
(c) Pesticides/Herbicides																						
(12) Dry Cell Batteries	0.637	0.82%	0.045	0.06%					0.086	0.00%	0.061	0.04%	0.084	0.02%	0.163	0.17%	0.000	0.01%	0.12	0.07	0.07%	0.04%
(13) Kitty Litter	9.500	4.89%	0.990	0.29%	1.200	1.02%									2.371	2.12%	7.600	4.91%	2.34	1.21	1.47%	0.69%
(14) Medical Wastes	0.079	0.04%	0.098	0.07%	0.008	0.01%	0.043	0.03%	0.056	0.04%	0.307	0.19%	0.012	0.01%	0.098	0.09%	0.081	0.08%	0.06	0.03	0.06%	0.02%
(15) Miscellaneous			0.447	0.33%	6.320	5.05%	0.111	0.08%	0.200	0.14%			0.288	0.27%	1.360	1.15%			0.96	0.76	0.83%	0.62%
(16) BLUE BOX ITEMS (a) Newsprint	34.400	17.88%	21.360	15.57%			15.450	11.40%	12.900	9.37%	15.600	9.89%	12.600	11.96%	8.200	7.33%			13.63	3.54	9.98%	2.04%
(b) Liquor / Wine Bottles	2.400	1.24%	2.750	2.01%			1.300	0.98%			0.390	0.16%	0.200	0.19%					0.77	0.37	0.51%	0.24%
(c) Food Jars / Other Bottles	3.700	1.92%	0.700	0.51%			1.250	0.92%	1.600	1.08%	3.000	1.27%	0.300	0.32%					1.10	0.43	0.70%	0.23%
(d) Food Cans (i) ferrous	3.600	1.87%					0.550	0.41%	3.150	2.28%	1.000	0.67%	1.000	0.90%					1.06	0.48	0.68%	0.29%
(ii) non-ferrous																						
(e) Beer Cans (i) ferrous																						
(ii) non-ferrous									0.100	0.07%									0.01	0.01	0.01%	0.01%
(iii) American																						
(f) Pop Cans (i) ferrous	0.080	0.09%	0.430	0.33%			0.080	0.04%	0.100	0.07%	0.080	0.05%							0.06	0.06	0.05%	0.04%
(ii) non-ferrous	1.600	0.63%	0.300	0.39%			0.800	0.19%	0.050	0.04%	0.300	0.13%	1.080	0.97%					0.48	0.19	0.39%	0.18%
(g) PET Bottles	0.080	0.08%																	0.00	0.00	0.00%	0.02%
(h) Plastic Jugs	1.100	0.57%	0.600	0.44%			0.430	0.32%	0.180	0.11%	0.700	0.44%	0.100	0.09%					0.39	0.16	0.33%	0.08%
(i) OCC									0.100	0.07%					0.900	0.18%			0.08		0.03%	
	193.07	100.00%	137.15	100.00%	117.88	100.02%	130.30	100.02%	136.16	100.00%	157.88	100.00%	107.98	100.00%	111.98	100.02%	154.80	100.02%	139.89		100.02%	
*** WEIGHT OF BLUE BOX ITEMS DIVIDED BY 6 *** (see Methods & Materials)	TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg					

MISCELLANEOUS ITEMS

NOTE: *** = NO WEIGHT RECORDED

SAMPLE #	ITEM	WEIGHT (kg)
1	light bulbs (6)	**********
2	copper tube	0.045
	cosmetics various containers	0.402
	light bulbs (2)	**********
		0.447
3	electrical wire	0.332
	drum kit (wood metal)	8.105
	calculator	0.004
	light bulb (1)	**********
		8.326
4	plastic metal toy	0.111
		0.111
5	tube of silicon	0.900
	light bulbs (3)	**********
		0.900
6	light bulbs (4)	**********
7	electrical fuse box (ABS?)	0.268
	paint tubes	0.030
	light bulbs (5)	**********
		0.298
8	electrical fuses glass	0.043
	vaccum bag	1.217
	light bulbs (3)	**********
		1.360
9	light bulbs (3)	**********

Ministry of the Environment
Waste Composition Study

GORE & STORRIE LIMITED

Town: EAST YORK
Enumeration Area: 00 - 300 low income, primarily mixed dwellings
n = : 131 - 199
Collection Dates: Tuesday November 14
Thursday November 16

SAMPLE #	1 kg	1 % wt	2 kg	2 % wt	3 kg	3 % wt	4 kg	4 % wt	5 kg	5 % wt	6 kg	6 % wt	7 kg	7 % wt	8 kg	8 % wt	9 kg	9 % wt	MEAN (kg)	SE (kg)	MEAN (%)	SE (%)
																			MEAN AND STANDARD ERROR ON A WEIGHT BASIS		MEAN AND STANDARD ERROR ON A PERCENT BASIS	
(1) Paper (a) Newsprint	4.900	4.54%	11.900	9.00%	14.700	10.50%	3.900	3.28%	1.000	1.54%	8.900	7.05%	3.100	2.70%	8.400	6.20%	1.800	2.20%	6.31	1.56	3.37%	1.04%
(b) Fine Paper / CPO / Ledger	5.300	5.25%	8.200	5.03%	3.100	2.21%	0.900	1.05%	0.900	1.47%	2.400	1.05%	2.100	1.82%	1.000	1.29%	0.300	0.38%	2.35	0.84	2.27%	0.57%
(c) Magazines / Flyers	3.900	3.38%	8.000	6.47%	10.300	7.30%	2.900	3.38%	1.300	2.40%	1.000	0.80%	3.100	2.70%	3.000	2.45%	1.800	2.39%	3.90	1.07	3.44%	0.71%
(d) Waxed / Plastic / Mixed	2.300	2.17%	1.580	1.26%	4.100	2.85%	2.100	2.48%	0.800	1.31%	2.400	1.05%	2.600	2.26%	2.247	1.82%	1.000	1.27%	2.12	0.32	1.84%	0.18%
(e) Boxboard	4.600	4.34%	6.200	5.07%	6.300	4.64%	4.000	5.74%	2.900	4.75%	5.100	4.09%	4.300	3.74%	3.100	2.51%	2.300	2.03%	4.43	0.48	4.22%	0.54%
(f) Kraft	1.600	1.54%	1.600	1.29%	3.100	1.38%	1.100	1.32%	0.300	0.82%	1.000	1.28%	1.400	1.22%	1.700	1.38%	0.700	0.39%	1.57	0.17	1.25%	0.08%
(g) Wallpaper																						
(h) OCC	12.600	12.64%	3.100	2.51%	2.700	1.93%	1.000	1.87%	0.800	1.31%	1.168	0.94%	3.400	2.90%	11.900	9.08%	0.213	0.27%	4.11	1.34	3.72%	1.41%
(i) Tissues	4.800	4.74%	5.100	4.13%	4.900	3.14%	6.000	8.00%	2.000	3.27%	7.100	5.60%	4.900	4.26%	4.200	3.40%	2.300	2.03%	4.83	0.34	4.40%	0.25%
(2) Glass (a) Beer (i) refillable																						
(ii) non-refillable																						
(b) Liquor & Wine Containers	1.900	1.18%	1.300	1.05%	0.633	0.59%	0.060	0.07%			2.187	1.75%			0.491	0.40%			0.67	0.30	0.58%	0.21%
(c) Food Containers	0.930	0.77%	0.600	0.45%	1.103	0.79%	0.980	1.15%	1.000	2.62%	2.693	2.16%	1.371	1.18%	1.414	1.14%	0.772	0.98%	1.27	0.21	1.27%	0.25%
(d) Soft Drink (i) refillable																						
(ii) non-refillable					0.468	0.55%													0.00	0.05	0.04%	0.04%
(e) Other Containers					0.036	0.03%									0.568	0.35%	0.759	0.90%	0.15	0.09	0.15%	0.11%
(f) Plate											0.088	0.05%							0.01	0.01	0.01%	0.01%
(g) Other	0.900	0.40%	0.604	0.49%	0.861	0.61%			0.413	0.84%							0.360	0.35%	0.39	0.10	0.29%	0.09%
(3) Ferrous (a) Soft Drink Containers	0.755	0.73%	0.095	0.08%	0.600	0.42%	0.160	0.19%			0.091	0.07%			0.081	0.03%	0.083	0.08%	0.20	0.08	0.18%	0.08%
(b) Food Containers	0.700	0.69%	0.900	0.73%	0.966	0.09%	1.100	1.29%	0.300	0.40%	2.400	1.05%	1.300	1.31%	3.400	1.94%	0.928	1.18%	1.24	0.24	1.14%	0.18%
(c) Beer Cans (i) returnable																						
(ii) non-returnable																						
(d) Aerosol Cans	0.228	0.35%	0.121	0.10%			0.095	0.11%	0.153	0.22%	0.437	0.32%			0.041	0.03%			0.12	0.00	0.11%	0.04%
(e) Other	0.300	0.79%	0.057	0.03%	1.897	0.63%			0.076	0.12%	0.092	0.07%	0.512	0.45%	0.558	0.47%	0.213	0.27%	0.40	0.15	0.32%	0.11%
(4) Non-Ferrous (a) Beer Cans (i) returnable	0.043	0.04%																	0.00	0.00	0.00%	0.00%
(ii) non-returnable																						
(iii) American					0.057	0.04%											0.015	0.03%	0.01	0.01	0.01%	0.00%
(b) Soft Drink Containers	0.080	0.03%	0.000	0.45%			0.163	0.19%	0.300	0.39%	0.600	0.84%	0.084	0.07%	0.900	0.16%	0.117	0.13%	0.24	0.09	0.25%	0.07%
(c) Other Packaging																						
(d) Aluminum	0.160	0.16%	0.240	0.19%	0.700	0.50%	0.128	0.19%	0.100	0.16%	0.600	0.39%	0.200	0.17%	0.500	0.94%	0.083	0.11%	0.29	0.08	0.22%	0.04%
(e) Other					0.100	0.07%							0.007	0.02%	1.000	0.85%			0.13	0.11	0.10%	0.00%
(5) Plastics (a) Polyolefine	3.829	3.79%	3.746	4.63%	8.600	5.71%	4.590	5.33%	3.307	5.51%	6.900	5.13%	6.300	5.48%	8.500	5.10%	3.900	4.82%	5.53	0.50	3.99%	0.15%
(b) PVC			0.225	0.18%	0.153	0.09%			0.233	0.33%	0.078	0.00%	0.001	0.02%			0.001	0.06%	0.09	0.00	0.09%	0.04%
(c) Polystyrene	0.200	0.20%	0.600	0.49%	0.550	0.38%	0.200	0.25%	0.300	0.49%	0.400	0.82%	0.900	0.78%	0.724	0.30%	0.330	0.49%	0.46	0.08	0.42%	0.08%
(d) ABS			0.270	0.22%													0.269	0.34%	0.00	0.04	0.08%	0.04%
(e) PET			0.108	0.09%							0.144	0.12%			0.280	0.25%			0.00	0.00	0.03%	0.03%
(f) Mixed Blend Plastic	0.300	0.29%	0.400	0.32%	0.400	0.25%	0.300	0.35%	0.100	0.18%	0.200	0.16%	0.300	0.26%	0.400	0.32%	0.800	0.95%	0.32	0.00	0.30%	0.04%
(g) Coated Plastic	0.119	0.19%	0.120	0.10%	0.125	0.09%	0.001	0.07%	0.010	0.00%	0.207	0.17%	0.011	0.01%	0.078	0.00%	0.100	0.18%	0.09	0.00	0.08%	0.03%
(h) Nylon																						
(i) Vinyl													0.093	0.08%					0.01	0.01	0.01%	0.01%
(6) Organic (a) Food Waste / Rodent Bedding	39.200	38.70%	45.700	36.97%	35.700	23.50%	33.300	39.03%	15.300	25.07%	50.700	40.62%	43.000	37.84%	35.000	25.82%	18.700	25.04%	35.36	3.87	33.03%	2.27%
(b) Yard Waste	3.000	*******		*******		*******	13.700	*******		*******	7.300	*******	2.000	*******		*******		*******	2.89	1.98	*******	*******
(7) Wood	1.300	1.27%	0.684	0.54%	0.867	0.55%	0.007	0.01%	0.040	0.08%	0.412	0.35%	2.300	1.91%	8.200	6.63%			1.48	0.87	1.25%	0.71%
(8) Ceramics / Rubble / Fiberglass / Gypsum Board / Asbestos					0.946	0.68%					0.709	0.57%			7.571	6.13%	0.589	0.40%	1.07	0.82	0.87%	0.66%
(9) Diapers	0.300	0.30%	3.000	3.42%	5.000	3.71%	7.700	9.03%	1.400	2.29%	0.700	0.50%	12.400	10.70%	2.000	1.78%	3.000	8.36%	4.20	1.31	4.15%	1.26%
(10) Textiles/Leather/Rubber	3.100	3.00%	2.900	2.35%	10.155	7.25%	1.105	1.29%	0.600	0.98%	8.600	6.25%	3.400	2.90%	3.095	2.50%	0.864	1.10%	3.76	1.13	3.13%	0.78%
(11) Household Hazardous Wastes (a) Paints / Solvents	0.125	0.12%	4.700	5.20%	0.072	0.05%													0.34	0.52	0.44%	0.42%
(b) Waste Oils							3.300	4.10%	0.962	1.58%									0.50	0.39	0.63%	0.47%
(c) Pesticides/Herbicides																						
(12) Dry Cell Batteries	0.309	0.21%	0.022	0.02%	0.010	0.01%									0.084	0.07%			0.04	0.00	0.03%	0.02%
(13) Kitty Litter					1.253	0.97%	0.629	0.73%	11.900	19.48%					9.400	7.61%			2.39	1.35	3.20%	2.19%
(14) Medical Wastes	0.035	0.03%	0.087	0.05%	0.019	0.01%	0.094	0.11%	0.275	0.46%	0.257	0.21%	0.325	0.28%	0.375	0.32%	0.332	0.43%	0.19	0.04	0.20%	0.00%
(15) Miscellaneous	0.330	0.32%	2.407	1.95%			3.471	4.07%	0.099	0.16%	0.589	0.47%			0.780	0.38%	10.779	13.70%	2.04	1.16	2.36%	1.44%
(16) BLUE BOX ITEMS (a) Newsprint	2.150	3.10%	3.650	4.37%	14.750	10.54%	8.300	2.70%	13.080	21.37%	11.550	5.25%	3.400	3.18%	4.150	3.30%	16.900	21.10%	8.84	1.80	5.34%	3.47%
(b) Liquor / Wine Bottles	0.300	0.49%			2.600	1.86%					2.750	3.20%	2.300	2.18%	0.430	0.30%	4.490	3.80%	1.47	0.34	1.42%	0.62%
(c) Food Jars / Other Bottles	1.900	1.43%	2.900	2.35%	2.464	1.78%	0.300	1.11%			1.642	1.32%	3.900	3.57%	1.200	0.97%	0.930	1.91%	1.81	0.30	1.41%	0.29%
(d) Food Cans (i) ferrous	0.650	0.64%	0.400	0.35%	1.400	1.04%	0.250	0.68%			0.290	0.29%	0.900	0.70%	0.800	0.62%	0.300	0.44%	0.57	0.14	0.06%	0.11%
(ii) non-ferrous																						
(e) Beer Cans (i) ferrous															0.015	0.01%			0.00	0.00	0.00%	0.00%
(ii) non-ferrous											0.087	0.08%							0.01	0.01	0.01%	0.01%
(iii) American																	0.087	0.05%	0.00	0.00	0.01%	0.01%
(f) Pop Cans (i) ferrous	0.300	0.20%	0.081	0.05%	0.300	0.14%	0.200	0.23%			0.058	0.05%	0.180	0.18%					0.09	0.00	0.09%	0.03%
(ii) non-ferrous	0.047	0.00%	0.013	0.01%	0.130	0.11%	0.100	0.18%			0.130	0.18%	0.100	0.09%			0.300	0.25%	0.08	0.00	0.08%	0.03%
(g) PET Bottles	0.098	0.04%											0.041	0.04%			0.130	0.19%	0.00	0.00	0.03%	0.02%
(h) Plastic Jugs	0.650	0.84%	0.180	0.15%	0.119	0.08%	0.200	0.82%			0.200	0.16%	0.650	0.57%	0.330	0.28%	0.700	0.89%	0.34	0.09	0.62%	0.10%
(i) OCC									0.211	0.54%			0.148	0.18%			0.052	0.07%	0.00		0.08%	
	101.30	100.00%	123.61	100.00%	140.00	100.00%	85.34	100.00%	61.07	100.00%	194.82	100.00%	114.96	100.00%	123.39	100.00%	78.67	100.00%	100.90		100.00%	
	TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg					

*** WEIGHT OF BLUE BOX ITEMS DIVIDED BY 9 ***
(see Methods & Materials)

MISCELLANEOUS ITEMS

NOTE: *** = NO WEIGHT RECORDED

SAMPLE #	ITEM	WEIGHT (kg)
1	car wax	0.130
	vaccum dust	0.188
	light bulb (1)	*********
		0.332
2	calculator	0.099
	vaccum bag dust	1.847
	walkman radio	0.333
	electrical switch	0.075
	light bulbs (3)	0.056
		2.407
3	light bulbs (9)	*********
4	lamp (metal)	3.000
	motor oil filter	0.471
	light bulbs (2)	*********
		3.471
5	steel and plastic brush	0.099
		0.099
6	video cassettes	0.536
	car bumper (metal plastic)	0.052
	light bulbs (4)	*********
		0.588
7	light bulb (6)	*********
8	stove elements	[illegible]
	electrical fuse glass	0.034
		0.780
9	cardboard/plastic spool	0.175
	wood frame windows	10.600
	light bulb (1)	*********
		10.775

GORE & STORRIE LIMITED

Town: EAST YORK
Enumeration Area: 65 - 900 high income, primarily single detached
n = : 101 - 109
Collection Dates: Tuesday October 24
Thursday October 30

SAMPLE #	1 kg	1 % wt	2 kg	2 % wt	3 kg	3 % wt	4 kg	4 % wt	5 kg	5 % wt	6 kg	6 % wt	7 kg	7 % wt	8 kg	8 % wt	9 kg	9 % wt	MEAN AND STANDARD ERROR ON A WEIGHT BASIS MEAN (kg)	SE (kg)	MEAN AND STANDARD ERROR ON A PERCENT BASIS MEAN (%)	SE (%)
(1) Paper (a) Newsprint	3.500	3.43%	3.900	2.33%	1.600	1.37%	5.200	3.52%	14.300	7.53%	0.400	0.27%	6.400	5.43%	8.300	7.39%	12.600	8.04%	6.49	1.54	4.37%	0.90%
(b) Fine Paper / CPO / Ledger	2.800	1.74%	25.900	14.24%	3.300	4.04%	2.700	1.83%	2.200	1.69%	2.100	1.44%	1.200	1.02%	4.200	3.74%	3.900	2.49%	5.48	2.84	3.56%	1.09%
(c) Magazines / Flyers	7.300	4.07%	10.300	6.26%	9.900	7.55%	18.100	12.24%	17.900	9.42%	5.500	3.77%	8.400	7.13%	8.900	7.92%	19.100	12.19%	11.76	1.72	7.91%	0.99%
(d) Waxed / Plastic / Mixed	3.600	2.21%	3.400	2.06%	3.100	3.89%	8.700	5.88%	4.100	2.16%	2.600	1.78%	2.500	2.12%	3.700	3.29%	3.600	2.30%	4.14	0.62	2.86%	0.44%
(e) Boxboard	4.200	2.62%	6.300	3.73%	3.100	3.89%	5.300	3.58%	12.700	6.69%	7.734	5.31%	3.100	2.63%	5.300	4.72%	5.100	3.25%	6.09	0.86	4.00%	0.44%
(f) Kraft	2.400	1.49%	1.600	0.95%	1.200	0.03%	1.900	1.08%	2.600	1.36%	1.100	0.73%	1.900	0.35%	0.900	0.80%	1.200	0.77%	1.50	0.19	1.00%	0.08%
(g) Wallpaper																						
(h) OCC	3.100	1.03%	3.300	2.00%	4.300	3.28%	1.900	1.29%	5.300	2.79%	2.300	1.58%	3.379	2.87%	1.500	1.33%	1.900	1.22%	3.01	0.42	2.05%	0.26%
(i) Tissues	3.900	2.45%	3.700	3.21%	3.900	2.73%	8.500	5.75%	11.300	5.95%	5.500	3.77%	2.900	2.46%	5.200	4.61%	4.700	3.00%	5.87	0.91	3.79%	0.46%
(2) Glass (a) Beer (i) refillable			3.900	2.33%															0.43	0.43	0.26%	0.26%
(ii) non-refillable																						
(b) Liquor & Wine Containers			2.400	1.43%	1.070	0.83%			1.700	0.90%							0.700	0.45%	0.63	0.30	0.40%	0.18%
(c) Food Containers	2.679	1.67%	0.390	0.23%	0.647	0.49%	1.260	0.86%	0.908	0.48%	0.229	0.16%	1.139	0.97%	2.097	1.87%	0.600	0.37%	1.21	0.30	0.87%	0.24%
(d) Soft Drink (i) refillable															1.300	1.16%			0.17	0.17	0.13%	0.13%
(ii) non-refillable			0.637	0.38%	1.037	0.79%					0.179	0.12%							0.21	0.15	0.14%	0.09%
(e) Other Containers									0.069	0.04%	0.057	0.04%							0.01	0.01	0.01%	0.01%
(f) Plate															0.139	0.12%			0.02	0.02	0.01%	0.01%
(g) Other	0.012	0.01%	0.557	0.33%	0.084	0.06%	0.204	0.21%	0.281	0.15%	4.614	3.12%	0.280	0.24%	0.004	0.00%			0.59	0.50	0.47%	0.34%
(3) Ferrous (a) Soft Drink Containers	0.060	0.04%	0.118	0.07%	0.062	0.05%	0.155	0.10%	0.031	0.02%					0.057	0.05%	0.662	0.42%	0.15	0.07	0.08%	0.04%
(b) Food Containers	1.200	0.73%	0.700	0.42%	1.411	1.08%	0.900	0.61%	1.513	0.80%	2.200	1.51%	0.567	0.48%	0.661	0.59%	0.900	0.57%	1.12	0.17	0.76%	0.11%
(c) Beer Cans (i) returnable			0.300	0.30%			0.017	0.01%											0.06	0.06	0.06%	0.06%
(ii) non-returnable																						
(d) Aerosol Cans	0.087	0.04%	0.427	0.25%	0.132	0.10%	0.577	0.39%	0.162	0.10%	0.199	0.14%	0.194	0.16%	0.309	0.28%	0.142	0.09%	0.23	0.04	0.16%	0.03%
(e) Other	0.173	0.11%	1.080	0.65%	0.160	0.12%	0.255	0.16%			14.543	9.98%	0.010	0.01%	4.615	4.57%	2.700	1.72%	2.65	1.59	1.90%	1.19%
(4) Non-Ferrous (a) Beer Cans (i) returnable			0.143	0.09%													0.074	0.05%	0.02	0.02	0.01%	0.01%
(ii) non-returnable																						
(iii) American																						
(b) Soft Drink Containers	0.081	0.05%	0.151	0.09%	0.086	0.07%	0.111	0.08%	0.260	0.14%	0.114	0.08%	0.032	0.03%	0.061	0.05%	0.166	0.11%	0.12	0.02	0.08%	0.01%
(c) Other Packaging											0.200	0.14%							0.02	0.02	0.02%	0.02%
(d) Aluminum	0.398	0.24%	0.140	0.08%	0.165	0.13%	0.227	0.15%	0.519	0.27%	2.189	1.50%	0.199	0.17%	0.157	0.14%	0.214	0.14%	0.47	0.22	0.31%	0.15%
(e) Other	0.015	0.01%	0.186	0.11%					1.161	0.61%									0.15	0.13	0.08%	0.07%
(5) Plastics (a) Polyolefins	7.690	4.79%	8.900	4.77%	5.408	4.13%	7.424	5.03%	8.900	4.74%	7.900	5.48%	4.100	3.48%	6.081	5.41%	13.900	8.87%	7.73	0.83	5.19%	0.50%
(b) PVC					0.069	0.05%			0.059	0.03%	0.070	0.05%							0.02	0.01	0.01%	0.01%
(c) Polystyrene	0.900	0.57%	0.900	0.54%	1.909	1.47%	0.637	0.43%	0.900	0.47%	0.779	0.55%	0.700	0.59%	0.000	0.00%	2.000	1.28%	1.04	0.16	0.72%	0.13%
(d) ABS											0.645	0.44%			0.139	0.12%			0.09	0.07	0.06%	0.05%
(e) PET	0.139	0.09%									0.093	0.07%							0.03	0.02	0.02%	0.01%
(f) Mixed Blend Plastic	0.200	0.12%	0.200	0.12%	0.340	0.26%	2.200	1.49%	0.900	0.38%	0.800	0.55%	0.539	0.46%	0.400	0.36%	1.600	1.02%	0.79	0.23	0.53%	0.15%
(g) Coated Plastic	0.200	0.12%	0.246	0.15%	1.300	1.14%	0.446	0.30%	0.747	0.39%	0.114	0.08%	0.060	0.05%	0.100	0.09%	0.200	0.13%	0.40	0.15	0.27%	0.12%
(h) Nylon																						
(i) Vinyl	0.108	0.12%			0.019	0.01%	1.159	0.79%			3.400	2.33%	0.042	0.04%					0.54	0.38	0.37%	0.26%
(6) Organic (a) Food Waste / Rodent Bedding	32.900	20.40%	24.900	14.94%	20.514	26.22%	35.900	24.27%	55.300	29.23%	27.100	18.60%	17.482	14.83%	37.930	33.08%	26.190	16.91%	31.38	3.63	21.43%	2.17%
(b) Yard Waste	16.900	********	65.300	********	70.300	********	16.900	********	11.300	********	73.900	********	54.900	********	43.100	********	22.300	********	40.18	8.25	********	******
(7) Wood	4.367	2.72%	0.737	0.44%	0.009	0.01%	1.073	0.73%	0.420	0.22%	4.906	3.36%	0.062	0.05%	0.553	0.49%	0.110	0.07%	1.36	0.65	0.90%	0.42%
(8) Ceramics / Rubble / Fiberglass / Gypsum Board / Asbestos	0.337	0.21%	14.704	8.75%	0.031	0.73%	0.550	0.37%	0.316	0.17%	1.636	1.12%			1.191	1.06%			2.10	1.59	1.36%	0.95%
(9) Diapers	6.300	3.39%	0.500	0.30%	4.600	3.56%	10.300	6.93%	4.900	2.45%	10.400	7.14%	0.600	0.54%			6.800	4.34%	5.10	1.39	3.53%	0.88%
(10) Textiles/Leather/Rubber	16.900	10.53%	3.363	2.00%	14.300	10.61%	3.520	2.38%	3.400	1.80%	6.973	4.79%	0.690	0.58%	3.695	3.29%	1.062	0.68%	6.00	1.03	4.11%	1.32%
(11) Household Hazardous Wastes (a) Paints / Solvents	0.016	0.01%	0.178	0.11%			0.140	0.10%			0.150	0.09%	1.956	1.66%	0.799	0.71%			0.36	0.22	0.30%	0.19%
(b) Waste Oils					0.016	0.01%													0.00	0.00	0.00%	0.00%
(c) Pesticides/Herbicides			0.477	0.28%					0.064	0.03%	0.020	0.01%			1.300	1.16%			0.23	0.17	0.17%	0.13%
(12) Dry Cell Batteries	0.366	0.23%	0.008	0.05%	0.222	0.17%			0.010	0.01%	0.045	0.03%	0.090	0.08%			0.630	0.40%	0.16	0.07	0.10%	0.05%
(13) Kitty Litter	5.362	3.36%	7.559	4.51%	2.600	1.98%	3.215	2.18%	0.348	0.18%	1.598	1.09%	0.490	0.42%	2.400	2.14%			2.73	0.89	1.85%	0.54%
(14) Medical Wastes	0.430	0.27%	0.111	0.07%			0.272	0.18%	0.321	0.17%	0.105	0.07%	0.062	0.05%	0.060	0.05%	0.067	0.04%	0.16	0.05	0.10%	0.03%
(15) Miscellaneous	0.857	0.53%	2.749	1.64%	10.250	7.82%	0.911	0.62%	1.989	1.05%	0.255	0.18%	35.749	30.35%	1.396	1.24%	5.686	3.63%	6.70	3.79	5.27%	3.57%
(16) BLUE BOX ITEMS (a) Newsprint	28.800	17.94%	25.150	14.99%	16.800	12.61%	13.530	9.16%	24.630	13.09%	18.950	13.07%	19.400	16.48%	3.400	3.01%	25.430	16.41%	20.11	2.71	13.51%	1.56%
(b) Liquor / Wine Bottles	6.500	3.99%	1.800	1.10%	0.990	0.79%	6.800	4.17%	4.400	2.32%	2.650	1.89%	2.250	1.81%	1.530	1.36%	3.400	2.17%	3.52	0.68	2.31%	0.30%
(c) Food Jars / Other Bottles	3.963	2.46%	5.600	3.37%	2.150	1.64%	2.300	1.84%	1.900	0.84%	2.450	1.68%	1.447	1.23%	0.497	0.44%	1.579	1.01%	2.40	0.49	1.56%	0.29%
(d) Food Cans (i) ferrous	1.050	0.65%	1.900	1.16%	1.150	0.88%	1.150	0.78%	1.700	0.90%	1.900	0.84%	1.900	0.85%	0.930	0.51%	1.400	0.89%	1.16	0.15	0.79%	0.08%
(ii) non-ferrous									0.008	0.00%									0.00	0.00	0.00%	0.05%
(e) Beer Cans (i) ferrous																						
(ii) non-ferrous	0.044	0.03%					0.010	0.01%	0.064	0.03%	0.030	0.02%							0.01	0.01	0.01%	0.00%
(iii) American	0.063	0.04%	0.098	0.06%	0.150	0.11%			0.010	0.01%							0.030	0.02%	0.03	0.02	0.02%	0.01%
(f) Pop Cans (i) ferrous	0.016	0.01%			0.150	0.11%			0.330	0.18%							0.530	0.41%	0.12	0.08	0.08%	0.05%
(ii) non-ferrous	0.100	0.06%	0.300	0.18%	0.100	0.08%	0.010	0.01%	0.330	0.18%	0.250	0.17%	0.050	0.04%	0.066	0.06%	0.900	0.57%	0.23	0.09	0.17%	0.06%
(g) PET Bottles	0.123	0.08%			0.120	0.09%	0.035	0.02%					0.022	0.02%			0.350	0.22%	0.08	0.04	0.05%	0.03%
(h) Plastic Jugs	0.061	0.04%	0.250	0.12%			0.550	0.37%	0.150	0.08%	0.089	0.06%	0.083	0.07%			0.300	0.19%	0.18	0.07	0.11%	0.04%
(i) OCC							0.850	0.57%	0.150	0.08%	0.750	0.51%					0.750	0.48%	0.28		0.16%	
TOTAL kg	160.65	100.00%	167.79	100.00%	151.12	100.00%	147.69	100.00%	189.90	100.00%	145.73	100.00%	117.80	100.00%	112.38	100.00%	156.71	100.00%	147.77		100.00%	

*** WEIGHT OF BLUE BOX ITEMS DIVIDED BY 2 ***
(see 2.2.4 Data Management)

MISCELLANEOUS ITEMS

NOTE: *** = NO WEIGHT RECORDED

SAMPLE #	ITEM	WEIGHT (kg)
1	light bulbs (5)	**********
	electrical fuses glass (2)	**********
	brass frame	0.512
	saniflush cleaner	0.085
	air freshener solid	0.162
	magic marker pen	0.052
	make-up and case	0.046
		0.857
2	light bulbs (5)	**********
	telephone books	1.9
	vaccum bags	0.267
	photo-degradable bags	0.164
	floor wax in HDPE container	0.415
		2.749
3	light bulbs (5)	**********
	telephone book	10.237
	electrical wire	0.013
		10.250
4	electrical wire	0.117
	magic marker pens	0.103
	vaccum dust	0.689
	light bulb (1)	**********
		0.911
5	light bulbs (4)	**********
	rocks	0.087
	umbrella (material unknown	0.330
	plastic and metal glasses	0.001
	vaccum bag	1.169
	saniflush cleaner	0.430
		1.989
6	light bulbs (10)	**********
	typewriter cartridge	0.077
	electrical wire	0.155
	electrical fuse glass	0.023
		0.255
7	electric motor and parts	31.275
	electrical fuses glass	0.074
	telephone books	4.4
	light bulbs (4)	**********
		35.749
8	light bulbs (9)	**********
	photographic equipment	0.498
	electrical wire	0.204
	brass	0.088
	electric motor	0.389
	can of glue (Lepages)	0.217
		1.396
9	asphalt piece	2.103
	electrical motor	3.066
	electric shaver	0.498
	electrical switches	0.019
	light bulbs (5)	**********
		5.686

Ministry of the Environment
Waste Composition Study

GORE & STORRIE LIMITED

Town: EAST YORK
Enumeration Area: 90 – 117 high income; mixed dwellings
n = ; 151 – 159
Collection Dates: Tuesday November 29
Thursday November 30

SAMPLE #	1 kg	1 % wt	2 kg	2 % wt	3 kg	3 % wt	4 kg	4 % wt	5 kg	5 % wt	6 kg	6 % wt	7 kg	7 % wt	8 kg	8 % wt	9 kg	9 % wt	MEAN AND STANDARD ERROR ON A WEIGHT BASIS: MEAN (kg)	SE (kg)	MEAN AND STANDARD ERROR ON A PERCENT BASIS: MEAN (%)	SE (%)
(1) Paper (a) Newsprint	6.200	5.25%	11.300	15.08%	4.300	3.18%	5.400	4.65%	4.300	2.89%	1.000	1.00%	6.000	4.77%	9.000	7.83%	15.000	15.43%	7.34	1.46	6.57%	1.58%
(b) Fine Paper / CPO / Ledger	1.200	1.02%	0.700	0.80%	2.400	1.78%	2.600	2.24%	2.400	1.64%	1.700	1.45%	1.800	1.50%	1.600	1.27%	0.800	0.77%	1.75	0.23	1.39%	0.17%
(c) Magazines / Flyers	9.000	6.39%	3.400	5.87%	8.100	5.99%	6.980	5.94%	22.600	15.10%	6.400	5.73%	7.000	5.71%	7.000	6.01%	3.300	3.18%	8.42	1.91	6.60%	1.18%
(d) Waxed / Plastic / Mixed	2.270	1.93%	5.000	4.10%	3.000	2.00%	4.225	5.04%	2.000	1.08%	2.000	2.37%	1.900	1.57%	4.008	5.22%	2.555	2.46%	3.10	0.27	2.83%	0.29%
(e) Boxboard	3.900	3.39%	3.400	3.87%	7.700	3.70%	7.400	6.37%	5.000	3.00%	5.000	4.97%	6.900	4.99%	4.100	3.24%	10.500	9.93%	6.16	0.73	5.14%	0.70%
(f) Kraft	1.500	1.27%	0.552	0.61%	1.000	1.41%	3.200	1.89%	1.700	1.14%	2.100	1.77%	1.700	1.23%	7.200	5.70%	1.300	1.45%	2.26	0.04	1.85%	0.39%
(g) Wallpaper																	1.000	1.34%	0.18	0.18	0.17%	0.17%
(h) OCC	3.400	2.88%	1.228	1.40%	5.373	3.00%	1.300	1.29%	3.300	2.33%	1.800	1.00%	15.000	11.40%	0.584	0.46%	1.759	1.09%	5.90	1.54	3.02%	1.11%
(i) Tissues	5.300	4.06%	4.000	4.55%	4.800	3.55%	6.300	5.42%	4.000	2.69%	6.200	5.27%	6.300	5.00%	3.400	2.69%	4.400	4.54%	5.21	0.51	4.84%	0.39%
(2) Glass (a) Beer (i) refillable									0.791	0.53%									0.09	0.09	0.06%	0.06%
(ii) non-refillable																	0.470	0.43%	0.09	0.05	0.06%	0.05%
(b) Liquor & Wine Containers	0.156	0.13%	3.300	5.98%	0.952	0.70%			0.750	0.49%	0.854	0.72%	0.607	0.44%	6.300	4.98%	2.053	2.86%	1.79	0.09	1.39%	0.62%
(c) Food Containers	0.603	0.88%	0.621	0.71%	1.522	1.15%	0.359	0.31%	3.441	2.31%	1.000	0.85%	1.016	0.74%	0.785	0.82%	0.400	6.17%	1.77	0.65	1.50%	0.61%
(d) Soft Drink (i) refillable																						
(ii) non-refillable			0.900	1.02%					0.090	0.47%	0.475	0.40%					0.241	0.23%	0.26	0.12	0.26%	0.12%
(e) Other Containers	0.061	0.05%																	0.01	0.01	0.01%	0.01%
(f) Plate			0.750	0.84%															0.08	0.08	0.09%	0.09%
(g) Other	0.768	0.65%	1.200	1.37%	0.202	0.15%	1.154	0.99%	1.106	0.74%			0.261	0.19%	0.500	0.40%	0.409	0.39%	0.62	0.15	0.54%	0.15%
(3) Ferrous (a) Soft Drink Containers					0.022	0.02%	0.150	0.13%	0.800	0.54%	0.053	0.05%	0.180	0.13%	0.031	0.02%	0.800	0.77%	0.23	0.11	0.10%	0.09%
(b) Food Containers	1.300	1.10%	0.751	0.85%	1.600	1.18%	1.200	1.03%	1.300	0.87%	1.000	1.00%	1.300	0.94%	1.700	1.34%	2.400	2.31%	1.49	0.16	1.33%	0.16%
(c) Beer Cans (i) returnable																						
(ii) non-returnable					0.212	0.16%													0.00	0.00	0.09%	0.09%
(d) Aerosol Cans	0.338	0.29%	0.300	0.57%	0.186	0.14%	0.577	0.50%	0.231	0.16%	0.353	0.30%	0.264	0.10%	0.263	0.21%	0.163	0.16%	0.32	0.00	0.28%	0.05%
(e) Other	1.353	1.15%	1.218	1.58%	0.400	0.30%	0.334	0.28%	1.148	0.77%	5.000	3.29%	0.974	0.70%			0.978	0.04%	1.14	0.34	0.08%	0.33%
(4) Non-Ferrous (a) Beer Cans (i) returnable	0.010	0.02%			0.025	0.02%			0.008	0.05%	0.400	0.34%	0.018	0.01%			0.154	0.18%	0.08	0.04	0.07%	0.04%
(ii) non-returnable																						
(iii) American									0.097	0.02%					0.300	0.34%	0.099	0.19%	0.05	0.05	0.04%	0.03%
(b) Soft Drink Containers	0.278	0.24%	0.300	0.29%	0.093	0.07%	0.070	0.06%	0.145	0.10%	0.048	0.04%	0.256	0.10%	0.800	0.63%	0.200	0.19%	0.23	0.06	0.18%	0.00%
(c) Other Packaging																						
(d) Aluminum	0.300	0.43%	0.079	0.09%	0.700	0.33%	0.382	0.30%	0.514	0.21%	0.300	0.25%	0.400	0.29%	0.400	0.30%	0.548	0.53%	0.42	0.06	0.30%	0.09%
(e) Other	0.262	0.22%					0.000	0.09%					0.023	0.09%					0.04	0.03	0.03%	0.02%
(5) Plastics (a) Polyolefins	7.781	6.00%	5.000	5.71%	7.100	3.23%	6.600	5.65%	7.000	4.70%	7.400	6.23%	6.700	4.84%	6.100	4.83%	5.000	5.40%	6.71	0.24	5.00%	0.26%
(b) PVC	0.085	0.07%	0.052	0.07%	0.096	0.07%	0.181	0.16%	0.700	0.47%	0.050	0.03%	0.038	0.03%	0.161	0.14%			0.16	0.07	0.12%	0.03%
(c) Polystyrene	1.100	0.88%	0.400	0.46%	0.058	0.71%	1.002	0.86%	1.100	0.74%	2.000	2.19%	0.600	0.40%	0.877	0.09%	0.700	0.67%	1.04	0.21	0.85%	0.18%
(d) ABS	1.959	1.18%																	0.15	0.15	0.15%	0.18%
(e) PET	0.171	0.14%	0.134	0.15%	0.195	0.19%			0.400	0.27%	0.094	0.05%	0.128	0.09%	0.088	0.55%	0.300	0.29%	0.29	0.07	0.16%	0.06%
(f) Mixed Blend Plastic	0.400	0.34%	0.001	0.10%	0.400	0.30%	0.400	0.09%	0.200	0.13%	0.321	0.19%	0.300	0.36%	0.400	0.32%	0.257	0.28%	0.37	0.07	0.30%	0.06%
(g) Coated Plastic	0.110	0.09%	0.107	0.13%	0.208	0.15%	0.200	0.17%	0.034	0.04%	0.118	0.10%	0.123	0.09%	0.132	0.10%	0.100	0.10%	0.15	0.09	0.11%	0.01%
(h) Nylon																						
(i) Vinyl																						
(6) Organic (a) Food Waste / Rodent Bedding	39.700	33.84%	14.600	16.81%	35.400	26.10%	35.800	30.02%	36.600	24.60%	23.000	19.88%	33.000	23.08%	27.400	21.57%	51.000	29.69%	31.11	2.06	25.47%	1.83%
(b) Yard Waste		*******	8.200	*******		*******		*******		*******		*******		*******	10.400	*******		*******	2.07	1.34	*******	******
(7) Wood	0.250	0.90%	1.818	2.07%	5.000	3.70%	1.488	1.28%	0.891	0.00%	5.416	2.86%	0.406	0.39%	0.401	0.32%	0.079	0.08%	1.54	0.55	1.28%	0.44%
(8) Ceramics / Rubble / Fiberglass / Gypsum Board / Asbestos	6.061	5.08%	0.307	0.32%	5.083	2.29%	0.253	0.83%			1.400	1.16%			0.098	0.08%			1.33	0.69	1.00%	0.36%
(9) Diapers			0.400	0.95%	1.000	0.74%	5.700	3.18%	5.300	3.70%			0.200	0.16%	7.400	5.65%	1.300	1.16%	2.16	0.91	1.69%	0.69%
(10) Textiles/Leather/Rubber	2.516	2.15%	18.666	21.26%	7.552	3.39%	3.000	2.58%	10.250	6.69%	7.000	6.40%	2.225	1.81%	7.541	5.73%	5.810	3.67%	6.90	1.74	6.21%	1.99%
(11) Household Hazardous Wastes (a) Paints / Solvents	1.268	1.07%	0.000	1.00%					0.366	0.19%							0.030	0.03%	0.24	0.18	0.20%	0.15%
(b) Waste Oils																						
(c) Pesticides/Herbicides																						
(12) Dry Cell Batteries	0.044	0.04%	0.044	0.05%			0.018	0.01%	0.237	0.16%	0.395	0.33%	0.049	0.04%	0.045	0.04%			0.09	0.04	0.07%	0.04%
(13) Kitty Litter									0.400	4.57%	1.700	1.43%					2.200	2.13%	1.10	0.76	0.00%	0.33%
(14) Medical Wastes					0.093	0.05%	0.008	0.01%	0.087	0.06%	0.080	0.07%	0.028	0.09%	0.314	0.17%			0.05	0.08	0.04%	0.08%
(15) Miscellaneous	2.771	2.35%	1.400	1.39%	5.250	3.88%			0.098	0.06%	5.847	4.44%	1.600	1.30%	0.708	0.66%	0.338	0.32%	1.90	0.09	1.61%	0.55%
(16) BLUE BOX ITEMS (a) Newsprint	10.750	9.11%	4.300	4.97%	19.250	12.00%	17.700	15.24%	16.400	11.16%	30.700	17.44%	26.750	19.34%	19.000	15.78%			14.78	2.86	11.86%	2.08%
(b) Liquor / Wine Bottles	1.400	1.18%			5.400	4.14%	0.750	0.65%	1.000	0.67%	5.000	2.57%	2.100	1.39%	3.100	1.66%			1.78	0.54	1.38%	0.44%
(c) Food Jars / Other Bottles	0.700	0.38%	0.094	0.11%	1.460	1.07%	1.750	1.51%	0.300	0.34%	1.250	1.05%	2.300	1.81%	2.750	2.18%			1.32	0.53	0.84%	0.26%
(d) Food Cans (i) ferrous	0.000	0.76%	0.250	0.85%	1.800	0.89%	0.600	0.73%	1.100	0.74%	0.600	0.51%	1.330	0.98%	0.146	0.11%			0.74	0.15	0.58%	0.11%
(ii) non-ferrous	0.009	0.01%					0.007	0.01%											0.00	0.00	0.00%	0.00%
(e) Beer Cans (i) ferrous																						
(ii) non-ferrous							0.017	0.01%					0.018	0.01%					0.00	0.00	0.00%	0.00%
(iii) American	0.010	0.01%			0.020	0.01%	0.094	0.08%	0.011	0.01%			0.100	0.07%					0.06	0.01	0.01%	0.01%
(f) Pop Cans (i) ferrous	0.013	0.01%			0.130	0.11%	0.100	0.08%			0.300	0.25%	0.015	0.01%	0.036	0.03%			0.07	0.06	0.06%	0.09%
(ii) non-ferrous	0.460	0.38%	0.080	0.06%	0.130	0.11%	0.300	0.47%	0.250	0.17%	0.100	0.09%	0.250	0.18%	0.017	0.01%			0.06	0.06	0.18%	0.05%
(g) PET Bottles	0.094	0.08%					0.034	0.06%											0.01	0.00	0.01%	0.00%
(h) Plastic Jugs	0.300	0.30%			0.088	0.08%	0.130	0.13%	0.750	0.30%	0.400	0.17%	0.250	0.18%					0.18	0.06	0.14%	0.06%
(i) OCC																						
	118.08	100.00%	87.86	100.00%	135.80	100.00%	116.17	100.00%	144.78	100.00%	116.71	100.00%	136.56	100.00%	126.46	100.00%	100.71	100.00%	121.47		100.00%	
	TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg					

*** WEIGHT OF BLUE BOX ITEMS DIVIDED BY 2 ***
(see 5.5.4 Data Management)

MISCELLANEOUS ITEMS

NOTE: *** = NO WEIGHT RECORDED

SAMPLE #	ITEM	WEIGHT (kg)
1	hair dryer metal/plastic	0.844
	electrical fuses glass?	0.378
	radio	1.310
	electrical wire	0.239
	light bulbs (7)	**********
		2.771
2	electrical wire	1.400
	light bulbs (2)	**********
		1.400
3	vaccum bag dust	0.843
	car headlamp	0.511
	electrical fuse glass	0.022
	flood lamp bulb	0.753
	wrist watch	0.022
	decoration plastic/wire	3.100
		5.250
4	light bulb (1)	**********
5	shotgun shells	0.098
	light bulbs (3)	**********
		0.098
6	telephone book	1.898
	plastic metal cap	0.185
	fuse box metal ABS?	3.300
	telphone parts	0.085
	light bulbs (14)	**********
		5.267
7	telephone book	1.800
	light bulb (1)	**********
		1.808
8	electrical fuse glass	0.022
	vaccum bag dust	0.684
	light bulbs (12)	**********
		0.706
9	vidio tape cassette	0.132
	vaccum bag dust	0.208
	light bulbs (3)	**********
		0.688

Ministry of the Environment
Waste Composition Study

GORE & STORRIE LIMITED

Town: EAST YORK
Enumeration Area. 90 - 055 low income; primarily multiple dwellings
n = : 111 - 119
Collection Dates: Tuesday October 30
Thursday November 2

SAMPLE #	1 kg	1 % wt	2 kg	2 % wt	3 kg	3 % wt	4 kg	4 % wt	5 kg	5 % wt	6 kg	6 % wt	7 kg	7 % wt	8 kg	8 % wt	9 kg	9 % wt	MEAN AND STANDARD ERROR ON A WEIGHT BASIS: MEAN (kg)	SE (kg)	MEAN AND STANDARD ERROR ON A PERCENT BASIS: MEAN (%)	SE (%)
(1) Paper (a) Newsprint	25.400	26.63%	32.300	34.90%	37.000	29.83%	12.700	11.82%	25.000	24.35%	41.700	41.38%	29.300	30.64%	26.700	29.66%	27.300	27.00%	28.06	2.73	29.63%	2.35%
(b) Fine Paper / CPO / Ledger	3.000	3.10%	2.900	3.18%	4.300	4.67%	0.000	0.36%	0.400	0.38%	1.000	1.39%	1.600	1.67%	1.155	1.26%	1.300	1.21%	1.72	0.40	1.64%	0.44%
(c) Magazines / Flyers	6.000	6.29%	3.300	2.71%	6.300	6.37%	1.800	1.67%	3.700	3.52%	2.800	2.79%	3.400	3.56%	5.500	6.11%	4.300	4.25%	4.04	0.53	4.21%	0.61%
(d) Waxed / Plastic / Mixed	3.410	3.57%	3.300	3.58%	0.800	0.64%	0.500	0.47%	0.300	0.17%	1.900	1.89%	1.600	1.67%	1.600	1.79%	1.600	1.32%	1.66	0.58	1.79%	0.41%
(e) Boxboard	3.100	3.25%	2.300	2.38%	3.600	3.86%	1.800	1.67%	1.148	1.02%	5.300	5.36%	2.500	2.61%	2.300	2.44%	1.400	1.42%	2.58	0.43	2.67%	0.47%
(f) Kraft	0.300	0.32%	1.500	1.63%	1.400	1.50%	0.700	0.65%	4.000	3.80%	0.400	0.40%	1.477	1.34%	0.300	0.36%	0.900	0.91%	1.26	0.37	1.29%	0.35%
(g) Wallpaper	0.019	0.02%											0.698	0.73%	7.600	8.44%	0.100	0.10%	0.94	0.84	1.02%	0.93%
(h) OCC	0.700	0.73%	7.000	7.38%	2.500	2.68%	17.400	16.19%	7.900	7.51%	1.300	1.29%	5.900	6.17%	2.700	3.00%	1.300	1.32%	5.21	1.76	5.10%	1.84%
(i) Tissues	2.600	2.73%	1.900	2.06%	3.500	3.75%	1.000	0.02%	0.300	0.10%	3.400	3.37%	1.300	1.37%	3.500	3.89%	3.700	3.74%	2.37	0.48	2.47%	0.45%
(2) Glass (a) Beer (i) refillable			0.250	0.29%															0.06	0.06	0.02%	0.02%
(ii) non-refillable			0.639	0.09%															0.07	0.07	0.08%	0.08%
(b) Liquor & Wine Containers			0.121	0.13%	0.330	0.33%	0.222	0.21%	2.900	2.10%	0.773	0.77%							0.41	0.24	0.39%	0.23%
(c) Food Containers	2.287	2.41%	0.218	0.24%	1.077	1.13%	0.387	0.37%	1.884	1.29%	0.792	0.79%	0.738	0.77%	0.755	0.84%			0.91	0.25	0.93%	0.26%
(d) Soft Drink (i) refillable	1.600	1.68%			0.214	0.23%			0.484	0.46%									0.26	0.20	0.30%	0.21%
(ii) non-refillable											0.214	0.21%							0.03	0.03	0.02%	0.02%
(e) Other Containers													0.010	0.01%					0.00	0.00	0.00%	0.00%
(f) Plate			3.000	3.42%															0.36	0.36	0.00%	0.00%
(g) Other			0.123	0.14%			0.578	0.54%			1.330	1.32%	2.547	2.71%	0.518	0.58%	12.401	12.63%	2.05	1.54	2.06%	1.56%
(3) Ferrous (a) Soft Drink Containers	0.061	0.02%	0.033	0.04%	0.296	0.33%	0.070	0.07%			0.330	0.33%	0.123	0.13%	0.053	0.07%	0.062	0.06%	0.11	0.04	0.12%	0.04%
(b) Food Containers	1.200	1.38%	0.700	0.76%	1.100	1.18%	0.500	0.47%	0.500	0.39%	2.700	2.88%	1.310	1.37%	0.500	0.33%	0.412	0.62%	0.95	0.25	0.97%	0.26%
(c) Beer Cans (i) returnable																						
(ii) non-returnable																						
(d) Aerosol Cans	0.495	0.53%	0.118	0.12%	0.378	0.41%					0.175	0.17%	0.076	0.07%	0.406	0.53%	0.296	0.29%	0.22	0.07	0.23%	0.07%
(e) Other			5.300	5.04%	0.833	0.88%	17.026	16.58%	2.480	2.37%	5.421	5.40%	0.846	0.88%	1.958	2.18%	2.016	2.04%	3.83	1.83	3.73%	1.70%
(4) Non-Ferrous (a) Beer Cans (i) returnable	0.019	0.02%	0.250	0.27%	0.008	0.10%					0.071	0.07%	0.038	0.04%					0.06	0.03	0.06%	0.02%
(ii) non-returnable																						
(iii) American	0.018	0.02%	0.034	0.04%	0.165	0.18%							0.040	0.04%	0.033	0.06%	0.053	0.09%	0.04	0.02	0.04%	0.02%
(b) Soft Drink Containers	0.275	0.29%	0.200	0.33%	0.191	0.20%	0.103	0.09%	0.000	0.00%	0.300	0.30%	0.065	0.07%	0.800	0.22%	0.330	0.36%	0.19	0.04	0.20%	0.04%
(c) Other Packaging																						
(d) Aluminum	0.129	0.14%	0.207	0.22%	0.351	0.38%	0.156	0.13%			0.107	0.11%	0.148	0.13%	0.423	0.47%	0.415	0.42%	0.22	0.05	0.23%	0.06%
(e) Other	0.258	0.27%			0.044	0.06%	1.221	1.14%			0.080	0.02%			0.583	0.65%	0.583	0.50%	0.30	0.14	0.30%	0.14%
(5) Plastics (a) Polyolefins	3.934	4.12%	3.800	4.12%	4.700	3.04%	3.900	2.70%	2.168	2.06%	4.820	4.78%	4.100	4.29%	3.600	4.02%	4.000	4.04%	3.78	0.28	3.91%	0.32%
(b) PVC	0.147	0.15%							0.061	0.08%	0.241	0.24%	0.098	0.10%	0.029	0.02%	0.098	0.02%	0.07	0.03	0.07%	0.02%
(c) Polystyrene	0.398	0.63%	1.148	1.24%	0.400	0.43%	0.271	0.25%	0.545	0.52%	0.294	0.29%	0.309	0.85%	0.384	0.43%	0.447	0.43%	0.48	0.10	0.48%	0.11%
(d) ABS																						
(e) PET	0.047	0.05%	0.129	0.14%	0.896	0.42%					0.123	0.12%	0.209	0.22%	0.313	0.33%	0.313	0.32%	0.17	0.06	0.18%	0.02%
(f) Mixed Blend Plastic	0.117	0.12%	0.100	0.11%	0.250	0.27%	0.083	0.08%	0.000	0.02%	0.488	0.48%	0.150	0.13%	0.100	0.11%	0.100	0.10%	0.15	0.06	0.16%	0.02%
(g) Coated Plastic	0.008	0.06%	0.000	0.02%	0.106	0.11%	0.098	0.02%			0.128	0.13%	0.029	0.02%	0.100	0.11%	0.110	0.11%	0.06	0.09	0.07%	0.02%
(h) Nylon																						
(i) Vinyl	0.146	0.15%	0.104	0.11%	0.088	0.09%			0.416	0.40%	0.374	0.37%	0.427	0.45%					0.17	0.06	0.17%	0.06%
(6) Organic (a) Food Waste / Rodent Bedding	35.200	36.00%	10.652	11.56%	18.000	10.29%	4.800	4.47%	10.400	15.02%	16.000	16.47%	13.500	14.12%	10.706	18.33%	17.000	18.10%	16.64	3.72	17.25%	2.89%
(b) Yard Waste		*******		*******		*******		*******		*******		*******		*******		*******		*******			*******	*******
(7) Wood	0.500	0.53%	0.739	0.80%	0.008	0.02%	5.800	5.40%	0.020	0.00%			2.814	2.94%	3.106	3.65%	0.008	0.01%	1.42	0.64	1.44%	0.06%
(8) Ceramics / Rubble / Fiberglass / Gypsum Board / Asbestos	0.072	0.08%	1.831	1.98%	0.718	0.77%			19.000	18.07%	0.104	0.10%	4.484	3.11%	0.478	0.53%	0.478	0.48%	3.06	2.06	3.01%	1.98%
(9) Diapers	0.700	0.79%			0.500	0.54%							0.100	0.10%	0.636	0.70%	0.500	0.51%	0.27	0.10	0.29%	0.11%
(10) Textiles/Leather/Rubber	2.736	2.87%	6.061	6.39%	2.061	2.21%	28.858	26.85%	8.248	7.85%	1.184	1.18%	9.726	10.17%	5.552	5.02%	12.312	12.65%	8.58	2.83	8.47%	2.63%
(11) Household Hazardous Wastes (a) Paints / Solvents	0.512	0.54%	0.800	0.86%	0.838	0.08%	2.700	2.51%			1.071	1.06%			1.309	1.58%	2.700	2.73%	1.06	0.34	1.10%	0.34%
(b) Waste Oils																	0.300	0.30%	0.03	0.03	0.02%	0.02%
(c) Pesticides/Herbicides																						
(12) Dry Cell Batteries					0.063	0.07%									0.018	0.02%	0.018	0.00%	0.01	0.01	0.01%	0.01%
(13) Kitty Litter											1.380	1.37%	3.168	3.31%	0.631	0.70%	0.631	0.64%	0.70	0.37	0.72%	0.38%
(14) Medical Wastes	0.166	0.17%	0.204	0.22%	0.325	0.35%	0.012	0.01%							0.029	0.33%			0.11	0.05	0.12%	0.02%
(15) Miscellaneous	0.413	0.43%	0.250	0.29%	0.779	0.83%	4.463	4.13%	7.696	7.33%	4.211	4.18%	1.393	1.57%			0.244	0.25%	2.16	0.89	2.12%	0.85%
(16) BLUE BOX ITEMS (a) Newsprint																						
(b) Liquor / Wine Bottles																						
(c) Food Jars / Other Bottles																						
(d) Food Cans (i) ferrous																						
(ii) non-ferrous																						
(e) Beer Cans (i) ferrous																						
(ii) non-ferrous																						
(iii) American																						
(f) Pop Cans (i) ferrous																						
(ii) non-ferrous																						
(g) PET Bottles																						
(h) Plastic Jugs																						
(i) OCC																						
TOTAL kg	95.45	100.00%	92.25	100.00%	93.83	100.00%	107.49	100.00%	105.13	100.00%	100.78	100.00%	95.61	100.00%	90.01	100.00%	98.91	100.00%	97.66		100.00%	

EA. 90-055 low income, primarily multiple dwellings

MISCELLANEOUS ITEMS

NOTE: *** = NO WEIGHT RECORDED

SAMPLE #	ITEM	WEIGHT (kg)
1	electrical switch	0.034
	vaccum bag	0.364
	mascara make-up	0.015
	light bulbs (2)	**********
		0.413
2	spark plugs (automobile)	0.215
	electrical fuse glass?	0.018
	light bulbs (2)	**********
		0.250
3	vaccum bag	0.779
	light bulb (1)	**********
		0.779
4	water pump metal/plastic	3.300
	water faucets plastic metal	0.263
	electrical wire	0.434
	oil filter (automobile)	0.338
	electrical fuses glass	0.067
	copper pipe	0.071
		4.463
5	books	3.510
	telephone books	3.900
	umbrella	0.269
	electrical fuses glass?	0.017
		7.696
6	electrical wire	4.100
	deodorant stick	0.111
		4.211
7	boat wax in metal can	0.118
	fluorescent light bulbs	0.275
	wood/fiberglass slo	1.200
	light bulbs (5)	**********
		1.393
8	light bulbs (3)	**********
9	propane gas tank	0.312
	electric fuse glass	0.083
	light bulbs (8)	**********
		0.244

Waste Composition Study

GORE & STORRIE LIMITED

Town: EAST YORK
Enumeration Area: 00 - 168 medium income; primarily single detached
n = 141 - 149
Collection Dates: Tuesday November 21
Thursday November 23

SAMPLE #	1 kg	1 % wt	2 kg	2 % wt	3 kg	3 % wt	4 kg	4 % wt	5 kg	5 % wt	6 kg	6 % wt	7 kg	7 % wt	8 kg	8 % wt	9 kg	9 % wt	MEAN AND STANDARD ERROR ON A WEIGHT BASIS: MEAN (kg)	SE (kg)	MEAN AND STANDARD ERROR ON A PERCENT BASIS: MEAN (%)	SE (%)
(1) Paper (a) Newsprint	11.100	9.62%	4.000	4.60%	5.100	4.74%	0.300	0.30%	7.400	9.19%	2.000	2.38%	2.300	1.50%	7.300	7.97%	2.600	1.96%	5.87	1.05	5.75%	1.12%
(b) Fine Paper / CPO / Ledger	0.900	0.78%	0.900	0.94%	1.000	1.78%	0.800	0.80%	0.700	0.87%	6.200	5.08%	2.000	1.28%	2.100	2.29%	2.500	1.91%	2.00	0.57	1.76%	0.42%
(c) Magazines / Flyers	4.700	4.07%	5.300	5.53%	8.400	7.80%	2.300	2.50%	3.400	4.33%	12.100	9.91%	5.300	5.30%	6.800	7.42%	7.000	5.34%	6.16	0.96	5.80%	0.79%
(d) Waxed / Plastic / Mixed	1.900	1.65%	1.500	1.56%	3.100	2.89%	0.900	0.90%	1.600	1.98%	2.000	2.42%	2.600	1.80%	1.400	1.53%	3.000	2.07%	2.21	0.33	1.97%	0.35%
(e) Boxboard	4.300	3.00%	4.100	4.28%	5.400	5.01%	3.000	3.00%	3.200	3.97%	4.500	3.69%	6.200	4.29%	3.700	4.04%	4.800	3.06%	4.38	0.34	3.08%	0.18%
(f) Kraft	1.400	1.21%	1.400	1.46%	5.300	4.92%	5.300	5.30%	0.545	0.94%	1.400	1.15%	2.100	1.45%	1.600	1.75%	2.300	1.66%	2.14	0.47	1.93%	0.44%
(g) Wallpaper																						
(h) OCC	3.500	3.03%	0.458	0.48%	2.400	2.23%	0.591	0.59%	0.500	0.62%	5.700	4.67%	4.300	2.97%	0.700	0.76%	1.400	1.07%	2.17	0.04	1.82%	0.49%
(i) Tissues	3.700	3.21%	5.000	5.22%	6.100	5.66%	2.600	2.60%	5.000	6.21%	3.700	3.03%	6.000	4.14%	3.800	4.15%	5.300	4.16%	4.63	0.30	4.29%	0.40%
(2) Glass (a) Beer (i) refillable	0.522	0.45%									0.369	0.47%					0.293	0.22%	0.15	0.06	0.19%	0.07%
(ii) non-refillable																						
(b) Liquor & Wine Containers	0.274	0.24%	4.400	4.50%	0.890	0.83%					1.400	1.13%			1.076	1.17%	1.400	1.07%	1.05	0.46	1.01%	0.48%
(c) Food Containers	0.418	0.36%	4.241	4.42%							1.100	0.90%	1.416	0.98%	2.608	2.85%	4.845	3.66%	1.65	0.62	1.47%	0.58%
(d) Soft Drink (i) refillable																						
(ii) non-refillable																						
(e) Other Containers					0.019	0.02%					0.504	0.41%			0.214	0.23%	0.130	0.09%	0.10	0.09	0.09%	0.05%
(f) Plate							0.135	0.15%	0.436	0.33%	0.700	0.62%					1.364	1.04%	0.30	0.15	0.26%	0.12%
(g) Other					0.075	0.07%							0.104	0.07%	0.008	0.04%	0.319	0.29%	0.06	0.00	0.06%	0.03%
(3) Ferrous (a) Soft Drink Containers					0.153	0.14%					0.063	0.05%			0.060	0.09%	0.125	0.10%	0.03	0.02	0.04%	0.03%
(b) Food Containers	0.785	0.68%	1.900	1.98%	0.909	0.84%	0.300	0.30%	0.190	0.25%	1.300	1.00%	1.000	1.11%	1.400	1.53%	2.700	2.06%	1.24	0.26	1.19%	0.22%
(c) Beer Cans (i) returnable																						
(ii) non-returnable																						
(d) Aerosol Cans			0.103	0.11%									0.514	0.35%			0.119	0.09%	0.08	0.06	0.06%	0.04%
(e) Other					7.833	7.20%	0.046	0.06%	1.602	1.09%	0.251	0.21%	0.330	0.33%	0.127	0.14%	0.093	0.07%	1.14	0.86	1.11%	0.80%
(4) Non-Ferrous (a) Beer Cans (i) returnable	0.035	0.03%					0.130	0.13%							0.300	0.33%			0.06	0.06	0.06%	0.06%
(ii) non-returnable																						
(iii) American															0.044	0.05%			0.00	0.00	0.01%	0.01%
(b) Soft Drink Containers			0.233	0.24%	0.075	0.07%	0.103	0.10%	0.094	0.12%	0.067	0.06%	0.141	0.10%	0.600	0.06%	0.048	0.04%	0.13	0.06	0.12%	0.07%
(c) Other Packaging																						
(d) Aluminum	0.177	0.15%	0.314	0.33%	0.097	0.09%	0.151	0.15%	0.250	0.26%	0.602	0.37%	0.500	0.35%	0.800	0.22%	0.400	0.31%	0.35	0.06	0.27%	0.03%
(e) Other	0.040	0.04%			0.077	0.07%					0.207	0.17%							0.04	0.00	0.03%	0.03%
(5) Plastics (a) Polyolefins	5.300	4.38%	5.100	5.32%	5.100	4.74%	1.000	1.90%	8.300	4.10%	8.883	7.36%	7.100	4.93%	4.373	4.77%	7.000	5.34%	5.34	0.70	4.77%	0.47%
(b) PVC			0.024	0.03%	0.177	0.16%							0.174	0.12%	0.078	0.09%			0.05	0.03	0.06%	0.02%
(c) Polystyrene	0.752	0.65%	0.300	0.31%	1.880	1.75%	0.145	0.14%	0.610	0.76%	1.300	0.98%	2.357	1.63%	0.700	0.76%	1.700	1.30%	1.07	0.85	0.93%	0.18%
(d) ABS																						
(e) PET	0.068	0.06%															0.072	0.05%	0.09	0.01	0.01%	0.01%
(f) Mixed Blend Plastic	0.200	0.17%	0.166	0.17%	0.400	0.37%	0.294	0.29%	0.145	0.18%	0.300	0.35%	0.300	0.21%	0.229	0.35%	0.000	0.66%	0.28	0.04	0.35%	0.03%
(g) Coated Plastic	0.035	0.03%	0.109	0.16%	0.200	0.19%	0.043	0.04%	0.112	0.14%	0.084	0.03%	0.180	0.19%	0.110	0.12%	0.300	0.23%	0.13	0.06	0.12%	0.02%
(h) Nylon																						
(i) Vinyl																						
(6) Organic (a) Food Waste / Rodent Bedding	33.400	28.95%	28.300	29.42%	30.849	28.74%	8.300	8.30%	22.800	28.30%	28.360	28.12%	45.000	31.70%	34.900	38.11%	29.300	30.12%	30.25	3.33	27.42%	2.75%
(b) Yard Waste		*******	1.300	*******		*******		*******	2.106	*******		*******	36.300	*******		*******	2.100	*******	3.39	2.85	*******	*******
(7) Wood	0.515	0.45%	7.630	7.97%	2.568	2.33%	0.038	0.04%	0.011	0.01%	0.245	0.30%	1.800	1.39%			0.536	0.41%	1.48	0.83	1.41%	0.86%
(8) Ceramics / Rubble / Fiberglass / Gypsum Board / Asbestos	4.000	3.47%	0.000	0.01%	0.558	0.52%	46.851	46.93%	0.097	0.12%	3.342	2.80%			1.900	1.97%	0.560	0.37%	0.87	5.10	8.24%	5.11%
(9) Diapers			0.300	0.21%	4.400	4.00%	4.200	4.70%	3.800	4.10%	7.000	5.47%	8.100	5.59%	1.775	1.94%	4.000	3.51%	3.96	0.96	3.60%	0.73%
(10) Textiles/Leather/Rubber	8.800	7.57%	4.200	4.98%	4.100	3.81%	1.300	1.90%	4.471	5.35%	1.129	0.92%	1.600	1.11%	2.100	2.29%	1.300	0.98%	3.26	0.79	3.12%	0.78%
(11) Household Hazardous Wastes (a) Paints / Solvents	0.178	0.15%	0.259	0.33%	0.755	0.70%					0.551	0.45%					0.135	0.10%	0.21	0.09	0.18%	0.08%
(b) Waste Oils																						
(c) Pesticides/Herbicides																						
(12) Dry Cell Batteries			0.412	0.48%							0.214	0.16%	0.088	0.06%					0.08	0.05	0.07%	0.06%
(13) Kitty Litter	4.200	3.94%			2.860	2.47%	2.000	2.00%			19.100	10.75%	7.400	5.11%			18.000	9.91%	4.77	1.78	3.83%	1.35%
(14) Medical Wastes	0.400	0.30%									0.336	0.29%	0.473	0.33%			0.329	0.23%	0.17	0.07	0.15%	0.05%
(15) Miscellaneous	1.204	1.04%	0.057	0.33%	2.145	1.99%	0.883	0.38%	0.208	0.26%	0.171	0.14%	0.230	0.16%	0.197	0.22%	1.067	0.60%	0.68	0.22	0.61%	0.20%
(16) BLUE BOX ITEMS (a) Newsprint	18.756	16.35%	13.330	14.14%	1.300	1.68%	5.300	5.30%	15.400	18.18%	7.800	6.51%	26.630	18.41%	5.600	0.12%	14.450	11.02%	12.13	2.69	10.98%	2.13%
(b) Liquor / Wine Bottles					1.550	1.44%	0.400	0.46%	0.000	1.12%			2.850	1.83%	1.800	1.97%	0.750	0.57%	0.89	0.31	0.81%	0.27%
(c) Food Jars / Other Bottles	1.800	1.38%	0.250	0.36%	0.500	0.46%	1.710	1.71%	3.200	3.87%	1.000	0.83%	1.750	1.21%	0.235	0.25%	1.000	0.78%	1.85	0.31	1.29%	0.58%
(d) Food Cans (i) ferrous	1.800	1.68%	0.400	0.42%	0.400	0.37%	0.300	0.30%	0.600	0.74%	0.550	0.45%	1.900	1.31%	0.300	0.33%	0.800	0.61%	0.78	0.19	0.66%	0.13%
(ii) non-ferrous																						
(e) Beer Cans (i) ferrous											0.060	0.04%							0.01	0.01	0.00%	0.00%
(ii) non-ferrous							0.800	0.30%					0.010	0.01%					0.03	0.03	0.03%	0.03%
(iii) American													0.083	0.04%			0.076	0.05%	0.01	0.01	0.01%	0.01%
(f) Pop Cans (i) ferrous	0.130	0.15%							0.015	0.08%	0.250	0.30%	0.200	0.19%			0.250	0.18%	0.10	0.04	0.08%	0.03%
(ii) non-ferrous	0.400	0.36%					0.136	0.15%	0.800	0.37%	0.009	0.01%	0.250	0.17%	0.300	0.33%	0.350	0.99%	0.29	0.08	0.20%	0.08%
(g) PET Bottles											0.008	0.08%	0.035	0.02%			0.067	0.05%	0.06	0.01	0.01%	0.01%
(h) Plastic Jugs	0.135	0.15%	0.097	0.09%			0.078	0.08%	0.150	0.15%			0.300	0.31%	0.043	0.08%	0.100	0.08%	0.09	0.06	0.08%	0.03%
(i) OCC															2.750	3.00%	1.000	0.78%	0.48		0.42%	
	115.96	100.00%	86.85	100.00%	107.76	100.00%	100.01	100.03%	86.58	100.00%	122.10	100.00%	144.75	100.00%	91.58	100.00%	131.19	100.08%	109.90		100.00%	
	TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg					

*** WEIGHT OF BLUE BOX ITEMS DIVIDED BY 9 ***
(see 2.2.4 Data Management)

Town: EAST YORK
EA. 00 - 168 medium income; primarily single detached

MISCELLANEOUS ITEMS

NOTE: *** = NO WEIGHT RECORDED

SAMPLE #	ITEM	WEIGHT (kg)
1	electrical switch	0.042
	calculator	0.016
	road salt	1.146
		1.204
2	hair dye	0.057
	light bulbs (2)	**********
		0.057
3	electric hair dryer	0.327
	vaccum bag dust	1.818
	light bulbs (2)	**********
		2.145
4	vaccum dust	0.883
		0.883
5	plastic/metal nuts and bolts	0.061
	camera flashbulb	0.145
	light bulbs (2)	**********
		0.206
6	thermometer (plastic)	0.079
	windshield wiper (rubber)	0.080
	light bulbs (10)	**********
		0.171
7	florescent light bulb	0.300
	vaccum dust	0.083
	light bulbs (4)	**********
		0.233
8	magic markers (plastic)	0.197
	light bulbs (2)	**********
		0.197
9	florescent light bulbs	0.613
	vaccum bag dust	0.458
	light bulb (1)	**********
		1.067

Waste Composition Study

GORE & STORRIE LIMITED

Town: EAST YORK - Christmas Collection
Enumeration Area: 90 - 117 high income; mixed dwellings
n = 161 - 169
Collection Date - Thursday December 28

SAMPLE #	1 kg	1 % wt	2 kg	2 % wt	3 kg	3 % wt	4 kg	4 % wt	5 kg	5 % wt	6 kg	6 % wt	7 kg	7 % wt	8 kg	8 % wt	9 kg	9 % wt	MEAN AND STANDARD ERROR ON A WEIGHT BASIS: MEAN (kg)	SE (kg)	MEAN AND STANDARD ERROR ON A PERCENT BASIS: MEAN (%)	SE (%)
(1) Paper (a) Newsprint	2.300	2.37%	2.000	2.21%	5.700	4.10%	2.800	3.04%	7.900	8.45%	2.000	2.10%	4.300	3.36%	2.300	2.55%	8.300	8.29%	3.89	0.68	4.38%	0.81%
(b) Fine Paper / CPO / Ledger	0.800	0.88%	1.900	2.10%	1.200	1.33%	1.000	1.08%	1.000	1.11%	1.200	1.32%	1.500	1.64%	0.700	0.75%	1.000	1.00%	1.14	0.12	1.26%	0.14%
(c) Magazines / Flyers	2.800	3.01%	1.800	1.00%	1.000	1.11%	1.000	1.73%			2.400	2.63%	1.000	1.80%	2.100	2.33%	2.000	2.84%	2.46	0.38	1.86%	0.33%
(d) Waxed / Plastic / Mixed	5.600	6.24%	3.000	3.55%	3.584	3.97%	6.787	7.34%	6.800	7.34%	8.300	6.80%	8.377	8.17%	4.400	4.88%	5.100	3.39%	ERR	ERR	6.60%	0.63%
(e) Boxboard	8.000	8.61%	11.000	12.10%	8.700	9.64%	8.000	6.67%	9.100	10.10%	11.000	12.71%	8.000	8.79%	8.000	8.88%	10.700	11.60%	7.08	1.09	10.26%	0.52%
(f) Kraft	1.900	2.04%	2.100	2.32%	0.900	1.00%	1.300	1.32%	1.400	1.55%	1.300	1.64%	1.000	1.75%	1.100	1.33%	0.800	0.87%	ERR	ERR	1.35%	0.16%
(g) Wallpaper																	5.100	5.57%	0.80	0.38	0.62%	0.65%
(h) OCC	6.700	7.21%	2.300	2.43%	3.100	3.45%	6.400	6.54%	6.900	7.66%	4.300	4.71%	2.800	2.85%	0.900	1.00%	1.300	1.45%	3.82	0.73	4.16%	0.85%
(i) Tissues	7.700	8.29%	5.800	6.41%	6.200	6.87%	5.700	6.10%	2.800	3.11%	6.100	6.69%	6.300	7.12%	5.600	6.21%	3.400	3.73%	5.33	0.51	6.06%	0.55%
(2) Glass (a) Beer (i) refillable	0.273	0.29%									0.243	0.27%							0.03	0.04	0.06%	0.04%
(ii) non-refillable			0.239	0.26%											0.913	1.01%			0.13	0.10	0.14%	0.11%
(b) Liquor & Wine Containers			0.341	0.38%	1.017	1.13%			1.800	2.11%	2.100	2.30%			5.300	5.87%	2.600	3.06%	1.30	0.59	1.63%	0.65%
(c) Food Containers	0.400	0.43%	1.596	1.76%	1.932	2.14%	0.837	0.00%	0.500	0.55%	0.800	0.88%	1.400	1.53%	3.400	3.77%	3.200	3.50%	1.58	0.37	1.73%	0.41%
(d) Soft Drink (i) refillable																						
(ii) non-refillable							0.450	0.49%	0.900	1.00%	0.251	0.98%					0.448	0.40%	0.25	0.11	0.27%	0.12%
(e) Other Containers					1.665	1.84%	0.168	0.18%									0.183	0.21%	0.22	0.18	0.25%	0.39%
(f) Plate			0.022	0.02%															0.00	0.00	0.00%	0.00%
(g) Other	0.691	0.74%	0.718	0.79%			0.175	0.10%			0.500	0.55%	0.339	0.37%	0.175	0.18%	0.112	0.12%	0.36	0.09	0.35%	0.10%
(3) Ferrous (a) Soft Drink Containers	0.117	0.13%	0.001	0.07%	0.132	0.15%	0.030	0.03%	0.000	0.09%	0.000	0.06%	0.092	0.10%	0.200	0.22%	0.800	0.87%	0.25	0.09	0.26%	0.10%
(b) Food Containers	1.000	1.08%	2.200	2.45%	1.100	1.22%	0.600	0.67%	0.900	1.00%	0.255	0.28%	1.200	1.42%	2.000	2.22%	2.500	2.73%	1.34	0.25	1.47%	0.27%
(c) Beer Cans (i) returnable																						
(ii) non-returnable																						
(d) Aerosol Cans					0.407	0.45%	0.347	0.43%	0.175	0.19%	0.105	0.13%	0.093	0.10%	0.777	0.86%	0.290	0.32%	0.25	0.08	0.27%	0.00%
(e) Other	0.089	0.10%	0.433	0.48%	0.054	0.04%	0.007	0.07%	0.057	0.06%	0.369	0.43%	0.312	0.34%			0.088	0.10%	0.16	0.00	0.18%	0.00%
(4) Non-Ferrous (a) Beer Cans (i) returnable			0.017	0.02%			0.051	0.05%	0.100	0.11%							3.300	3.50%	0.37	0.30	0.41%	0.39%
(ii) non-returnable																						
(iii) American			0.017	0.02%							0.300	0.33%			0.200	0.22%			0.03	0.03	0.06%	0.02%
(b) Soft Drink Containers	0.100	0.11%	0.102	0.11%	0.700	0.76%	0.803	0.04%			0.090	0.10%	0.088	0.07%	0.600	0.67%	1.000	1.09%	0.30	0.12	0.33%	0.13%
(c) Other Packaging													0.028	0.03%			0.054	0.06%	0.01	0.01	0.01%	0.01%
(d) Aluminum	0.400	0.45%	0.500	0.55%	0.800	0.88%	0.700	0.76%	0.300	0.33%	0.300	0.55%	1.000	1.09%	0.400	0.44%	0.300	0.33%	0.34	0.07	0.00%	0.08%
(e) Other													0.222	0.24%					0.00	0.00	0.02%	0.02%
(5) Plastics (a) Polyolefins	7.800	8.39%	6.400	7.08%	6.800	7.51%	7.200	7.80%	7.000	7.77%	8.000	8.43%	6.400	7.01%	7.200	7.98%	3.394	3.71%	6.73	0.66	7.39%	0.32%
(b) PVC			0.808	0.02%	0.058	0.06%	0.053	0.00%					0.100	0.11%	0.200	0.22%			0.00	0.08	0.08%	0.09%
(c) Polystyrene	0.700	0.75%	0.600	0.66%	0.700	0.78%	0.900	0.98%	0.800	0.99%	0.800	0.88%	0.000	0.94%	0.600	0.67%	1.000	1.09%	0.74	0.06	0.83%	0.07%
(d) ABS																						
(e) PET			0.127	0.14%							0.057	0.06%			0.273	0.30%	0.189	0.21%	0.07	0.03	0.08%	0.04%
(f) Mixed Blend Plastic	0.300	0.34%	0.100	0.11%	0.300	0.33%	0.600	0.65%	0.300	0.33%	0.400	0.44%	0.300	0.33%	0.800	0.33%	0.100	0.11%	0.32	0.00	0.35%	0.08%
(g) Coated Plastic	0.027	0.03%	0.073	0.08%	0.100	0.11%	0.100	0.11%	0.100	0.11%	0.024	0.03%	0.012	0.01%	0.139	0.93%	0.100	0.11%	0.08	0.00	0.09%	0.00%
(h) Nylon																						
(i) Vinyl																						
(6) Organic (a) Food Waste / Rodent Bedding	38.400	41.33%	38.900	43.01%	40.100	44.45%	38.300	41.55%	28.600	31.75%	34.700	38.05%	41.191	45.10%	39.200	43.45%	27.300	30.03%	36.32	1.07	39.83%	1.67%
(b) Yard Waste		*******		*******		*******		*******		*******		*******		*******		*******		*******			*******	
(7) Wood	1.604	1.75%	0.108	0.13%			0.019	0.03%	0.013	0.00%	0.124	0.14%	0.458	0.50%	0.173	0.18%	0.341	0.37%	0.33	0.17	0.54%	0.18%
(8) Ceramics / Rubble / Fiberglass / Gypsum Board / Asbestos	1.307	1.41%	1.040	1.15%	0.126	0.14%			0.535	0.59%	0.560	0.61%			0.194	0.82%	0.233	0.98%	0.44	0.15	0.46%	0.17%
(9) Diapers			0.290	0.33%	0.600	0.66%	3.400	3.00%									0.600	0.66%	0.34	0.07	0.39%	0.30%
(10) Textiles/Leather/Rubber	1.600	1.73%	4.409	4.38%	5.600	6.20%	3.900	4.33%	3.000	3.99%	3.600	5.03%	0.500	0.55%	1.200	1.55%	2.400	2.62%	2.06	0.53	3.27%	0.61%
(11) Household Hazardous Wastes (a) Paints / Solvents																						
(b) Waste Oils																						
(c) Pesticides/Herbicides							0.010	0.01%											0.00	0.00	0.00%	0.00%
(12) Dry Cell Batteries							0.166	0.18%	0.086	0.09%	0.066	0.07%	0.092	0.10%			0.031	0.03%	0.04	0.08	0.04%	0.00%
(13) Kitty Litter							0.425	0.44%	6.100	0.77%	0.798	0.67%	2.400	2.63%			1.339	1.63%	1.25	0.67	1.36%	0.74%
(14) Medical Wastes			0.011	0.01%	0.071	0.08%	0.019	0.02%	0.081	0.10%	0.193	0.31%	0.050	0.05%	0.258	0.30%			0.08	0.03	0.08%	0.09%
(15) Miscellaneous	2.009	2.16%	0.904	0.54%	0.063	0.07%	0.060	0.06%	2.466	2.74%					0.356	0.39%	2.392	2.61%	0.89	0.88	0.93%	0.40%
(16) BLUE BOX ITEMS (a) Newsprint																						
(b) Liquor / Wine Bottles																						
(c) Food Jars / Other Bottles																						
(d) Food Cans (i) ferrous																						
(ii) non-ferrous																						
(e) Beer Cans (i) ferrous																						
(ii) non-ferrous																						
(iii) American																						
(f) Pop Cans (i) ferrous																						
(ii) non-ferrous																						
(g) PET Bottles																						
(h) Plastic Jugs																						
(i) OCC																						
	92.90	100.00%	90.64	100.00%	90.27	100.00%	92.38	100.00%	90.13	100.00%	91.34	100.00%	91.83	100.00%	90.93	100.00%	91.31	100.00%	91.15		100.00%	
	TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg		TOTAL kg					

* note some weight apparently lost due to moisture loss

MISCELLANEOUS ITEMS

NOTE: *** = NO WEIGHT RECORDED

SAMPLE #	ITEM	WEIGHT (kg)
1	TV converter	2.009
		2.009
2	metal keys	0.112
	shoe polish in ferrous tin	0.057
	vaccum cleaner bag dust	0.183
	light bulbs (4)	**********
		0.304
3	cosmetics	0.063
	light bulb (1)	**********
		0.063
4	electrical fuses glass	0.058
	light bulb (1)	**********
		0.058
5	telephone book	1.034
	electrical switch plastic metal	0.625
	electric kettle	0.807
	light bulb (2)	**********
		2.466
6	light bulb (1)	**********
7	light bulbs (2)	**********
8	thermos	0.356
	light bulb (1)	**********
		0.356
9	vaccum bag dust	1.879
	brass ornament	0.014
	electrical wire	0.499
	light bulbs (2)	**********
		2.392

Ministry of the Environment
Waste Composition Study

GORE & STORRIE LIMITED

Town: EAST YORK
Enumeration Area: 163 Barrington Ave
n = : 151 - 159
04la

SAMPLE #	1 kg	1 % wt	2 kg	2 % wt	3 kg	3 % wt	4 kg	4 % wt	5 kg	5 % wt
(1) Paper (a) Newsprint	22.600	24.04%	29.100	25.85%	14.500	14.26%	17.700	18.04%	17.700	17.79%
(b) Fine Paper / CPO / Ledger	0.400	0.42%	0.900	0.80%	0.400	0.39%	3.500	3.57%	0.200	0.20%
(c) Magazines / Flyers	3.700	4.01%	4.000	3.55%	3.000	2.95%	1.100	1.12%	3.900	3.92%
(d) Waxed / Plastic / Mixed	1.300	1.37%	1.300	1.01%	1.400	1.38%	8.169	8.65%	3.544	3.56%
(e) Boxboard	4.900	5.17%	3.200	3.57%	3.300	3.21%	2.100	2.14%	4.500	4.53%
(f) Kraft	0.800	0.90%	1.100	1.16%	1.000	1.37%	1.100	1.12%	0.700	0.70%
(g) Wallpaper					0.200	0.20%			0.600	0.60%
(h) OCC	1.500	1.56%	1.100	1.16%	3.800	3.70%	7.000	7.13%	3.400	3.45%
(i) Tissues	1.800	1.90%	2.800	3.79%	3.800	3.74%	1.000	1.63%	3.400	3.45%
(2) Glass (a) Beer (i) refillable									1.500	1.51%
(ii) non-refillable							0.367	0.37%		
(b) Liquor & Wine Containers	1.800	1.90%	1.762	1.89%	0.103	0.10%	0.834	0.85%	3.500	3.52%
(c) Food Containers	0.408	0.43%	2.700	2.89%	1.911	1.88%			3.829	3.85%
(d) Soft Drinks (i) refillable										
(ii) non-refillable	0.256	0.27%	0.219	0.23%	1.214	1.19%	0.419	0.43%	0.130	0.10%
(e) Other Containers									0.461	0.96%
(f) Plate							0.408	0.42%		
(g) Other	1.074	1.15%	0.293	0.31%	2.020	1.99%			0.909	0.91%
(3) Ferrous (a) Soft Drink Containers	0.093	0.10%	0.130	0.14%	0.094	0.09%	0.441	0.45%	0.176	0.18%
(b) Food Containers	3.300	3.69%	4.800	3.15%	2.300	2.26%	0.747	0.76%	1.100	1.11%
(c) Beer Cans (i) returnable										
(ii) non-returnable										
(d) Aerosol Cans	0.271	0.29%							0.135	0.13%
(e) Other	0.360	0.39%	0.961	1.03%	1.712	1.68%	6.153	6.27%	3.009	3.02%
(4) Non-Ferrous (a) Beer Cans (i) returnable	0.185	0.20%			0.320	0.31%	0.017	0.03%	0.008	0.04%
(ii) non-returnable										
(iii) American	0.017	0.03%	0.095	0.10%			0.200	0.20%		
(b) Soft Drink Containers	0.953	1.00%	0.800	0.90%	0.269	0.26%	0.167	0.17%	0.900	0.90%
(c) Other Packaging	1.690	1.79%								
(d) Aluminum	0.296	0.31%	0.403	0.49%	0.221	0.22%	0.166	0.17%	0.400	0.41%
(e) Other	0.074	0.08%	0.510	0.56%	1.700	1.67%	0.544	0.55%		
(5) Plastics (a) Polyolefins	3.000	4.11%	7.600	8.13%	8.400	8.26%	5.901	5.98%	3.017	3.04%
(b) PVC	0.211	0.22%							0.133	0.13%
(c) Polystyrene	0.500	0.52%	0.500	0.54%	1.400	1.38%	0.800	0.82%	0.636	0.64%
(d) ABS					0.555	0.55%	0.050	0.05%	0.019	0.02%
(e) PET	0.153	0.16%	0.147	0.16%	0.199	0.20%	0.069	0.07%	0.105	0.10%
(f) Mixed Blend Plastic	0.300	0.33%	0.400	0.45%	0.146	0.14%	0.255	0.26%	0.200	0.20%
(g) Coated Plastic	0.200	0.21%	0.112	0.13%	0.058	0.10%	0.038	0.04%	0.100	0.10%
(h) Nylon										
(i) Vinyl									0.115	0.11%
(6) Organic (a) Food Waste / Rodent Bedding	18.998	20.03%	23.000	23.56%	23.875	23.49%	30.100	30.66%	24.424	24.54%
(b) Yard Waste	3.600	*******		*******		*******		*******		*******
(7) Wood			0.073	0.08%	0.800	0.79%	0.204	0.21%	0.400	0.40%
(8) Ceramics / Rubble / Fiberglass / Gypsum Board / Asbestos	3.566	3.75%			0.217	0.21%	1.092	1.11%	0.588	0.59%
(9) Diapers	13.300	14.05%	3.400	3.79%						
(10) Textiles/Leather/Rubber	2.662	2.81%	1.564	1.70%	3.142	3.05%	15.901	16.20%	3.200	3.22%
(11) Household Hazardous Wastes (a) Paints / Solvents					1.107	1.16%				
(b) Waste Oils										
(c) Pesticides/Herbicides										
(12) Dry Cell Batteries	0.141	0.15%	0.161	0.17%					0.013	0.00%
(13) Kitty Litter							3.300	3.36%	7.607	7.64%
(14) Medical Wastes	0.229	0.24%					0.019	0.01%	0.086	0.10%
(15) Miscellaneous	0.416	0.44%	1.058	1.13%	3.199	3.11%	0.023	0.02%	0.058	0.06%
(16) BLUE BOX ITEMS (a) Newsprint										
(b) Liquor / Wine Bottles										
(c) Food Jars / Other Bottles										
(d) Food Cans (i) ferrous										
(ii) non-ferrous										
(e) Beer Cans (i) ferrous										
(ii) non-ferrous										
(iii) American										
(f) Pop Cans (i) ferrous										
(ii) non-ferrous										
(g) PET Bottles										
(h) Plastic Jugs										
(i) OCC										
TOTAL kg	94.98	100.00%	93.99	100.00%	101.64	100.00%	98.19	100.00%	99.53	100.00%

SAMPLE #	6 kg	6 % wt	7 kg	7 % wt	8 kg	8 % wt	9 kg	9 % wt	MEAN (kg)	SE (kg)	MEAN (%)	SE (%)
									MEAN AND STANDARD ERROR ON A WEIGHT BASIS		MEAN AND STANDARD ERROR ON A PERCENT BASIS	
(1) Paper (a) Newsprint	13.600	14.80%	13.900	17.10%	14.300	16.14%	25.600	30.87%	16.80	1.74	18.82%	1.86%
(b) Fine Paper / CPO / Ledger	1.600	1.74%	1.400	1.51%	0.900	1.02%	0.700	0.74%	1.21	0.33	1.23%	0.34%
(c) Magazines / Flyers	2.600	2.83%	2.000	2.15%	4.800	5.42%	2.100	2.53%	3.47	0.49	3.67%	0.54%
(d) Waxed / Plastic / Mixed	2.900	2.30%	2.300	2.57%	1.940	2.06%	2.645	2.90%	2.77	0.72	3.00%	0.73%
(e) Boxboard	3.300	3.66%	4.300	4.96%	3.200	3.67%	4.700	4.89%	4.60	0.86	4.86%	0.57%
(f) Kraft	1.000	1.09%	1.300	1.40%	1.700	1.93%	1.600	1.70%	1.20	0.12	1.39%	0.12%
(g) Wallpaper					0.050	0.06%			0.10	0.07	0.10%	0.07%
(h) OCC	0.268	0.29%	1.300	1.40%	0.800	0.90%	1.600	1.20%	2.73	0.85	2.81%	0.84%
(i) Tissues	3.100	3.35%	3.100	3.50%	3.700	4.18%	3.600	4.05%	3.05	0.42	3.64%	0.46%
(2) Glass (a) Beer (i) refillable									0.17	0.17	0.17%	0.17%
(ii) non-refillable									0.07	0.07	0.07%	0.07%
(b) Liquor & Wine Containers	1.357	1.46%	0.359	0.39%	2.800	3.16%	2.604	2.75%	2.35	0.57	2.64%	0.60%
(c) Food Containers	4.300	4.68%	2.311	2.49%	4.538	5.12%	0.720	0.75%	3.30	0.57	2.90%	0.65%
(d) Soft Drinks (i) refillable												
(ii) non-refillable							0.673	0.80%	0.30	0.13	0.31%	0.12%
(e) Other Containers	0.130	0.18%					0.258	0.30%	0.11	0.06	0.11%	0.06%
(f) Plate	0.198	0.22%							0.07	0.03	0.07%	0.03%
(g) Other	1.676	1.82%	3.000	2.19%	0.048	0.05%	1.000	2.04%	1.04	0.30	1.09%	0.31%
(3) Ferrous (a) Soft Drink Containers	0.468	0.51%	0.100	0.11%	0.230	0.26%	0.400	0.49%	0.24	0.06	0.26%	0.05%
(b) Food Containers	3.700	2.94%	3.138	2.51%	5.200	5.87%	1.900	2.05%	2.71	0.51	2.90%	0.58%
(c) Beer Cans (i) returnable												
(ii) non-returnable												
(d) Aerosol Cans	0.353	0.38%	0.059	0.06%	0.204	0.34%	0.125	0.13%	0.14	0.03	0.13%	0.03%
(e) Other	0.111	0.12%	0.103	0.11%			0.400	0.53%	1.44	0.67	1.46%	0.68%
(4) Non-Ferrous (a) Beer Cans (i) returnable	0.064	0.06%	0.126	0.14%	0.084	0.09%	0.200	0.21%	0.11	0.03	0.13%	0.04%
(ii) non-returnable												
(iii) American			0.069	0.04%	0.196	0.13%	0.100	0.11%	0.07	0.02	0.07%	0.03%
(b) Soft Drink Containers	0.431	0.42%	0.252	0.25%	0.130	0.17%	0.220	0.34%	0.44	0.10	0.49%	0.11%
(c) Other Packaging									0.19	0.19	0.20%	0.20%
(d) Aluminum	0.308	0.33%	0.426	0.46%	0.200	0.23%	0.213	0.23%	0.30	0.04	0.33%	0.04%
(e) Other	0.100	0.11%			0.028	0.03%			0.35	0.19	0.33%	0.18%
(5) Plastics (a) Polyolefins	6.400	6.96%	3.100	3.50%	5.760	6.51%	6.000	6.57%	5.72	0.34	6.05%	0.36%
(b) PVC			0.121	0.13%	0.049	0.06%	0.130	0.13%	0.07	0.03	0.08%	0.03%
(c) Polystyrene	0.633	0.69%	0.600	0.65%	0.500	0.56%	0.600	0.64%	0.63	0.10	0.69%	0.10%
(d) ABS									0.07	0.06	0.07%	0.05%
(e) PET	0.065	0.07%	0.125	0.13%	0.800	0.93%	0.191	0.20%	0.15	0.00	0.16%	0.02%
(f) Mixed Blend Plastic	0.167	0.18%	0.220	0.24%	0.126	0.14%	0.277	0.30%	0.23	0.04	0.26%	0.04%
(g) Coated Plastic	0.200	0.22%	0.100	0.11%	0.156	0.17%	0.230	0.25%	0.14	0.00	0.14%	0.02%
(h) Nylon												
(i) Vinyl									0.01	0.01	0.01%	0.01%
(6) Organic (a) Food Waste / Rodent Bedding	33.600	33.35%	29.300	31.52%	23.500	26.52%	24.000	28.44%	24.31	1.30	25.90%	1.76%
(b) Yard Waste		*******		*******		*******		*******	0.40	0.40	*******	******
(7) Wood	0.342	0.37%			0.155	0.17%	0.164	0.17%	0.24	0.08	0.24%	0.08%
(8) Ceramics / Rubble / Fiberglass / Gypsum Board / Asbestos					0.233	0.26%	0.089	0.31%	0.94	0.38	0.97%	0.40%
(9) Diapers	3.100	3.35%	3.300	3.61%	3.400	3.84%	1.772	1.88%	3.80	1.41	4.08%	1.50%
(10) Textiles/Leather/Rubber	1.534	1.67%	2.155	2.33%	6.600	7.45%	3.400	3.61%	4.91	1.30	5.12%	1.52%
(11) Household Hazardous Wastes (a) Paints / Solvents									0.13	0.13	0.13%	0.13%
(b) Waste Oils												
(c) Pesticides/Herbicides												
(12) Dry Cell Batteries	0.043	0.03%	3.600	4.04%			0.029	0.00%	0.67	0.63	0.73%	0.67%
(13) Kitty Litter			1.622	1.75%	0.125	0.14%			1.43	0.44	1.66%	0.89%
(14) Medical Wastes			0.083	0.09%	0.008	0.01%	0.058	0.06%	0.03	0.03	0.03%	0.03%
(15) Miscellaneous					0.163	0.18%	0.493	0.53%	0.62	0.36	0.63%	0.35%
(16) BLUE BOX ITEMS (a) Newsprint												
(b) Liquor / Wine Bottles												
(c) Food Jars / Other Bottles												
(d) Food Cans (i) ferrous												
(ii) non-ferrous												
(e) Beer Cans (i) ferrous												
(ii) non-ferrous												
(iii) American												
(f) Pop Cans (i) ferrous												
(ii) non-ferrous												
(g) PET Bottles												
(h) Plastic Jugs												
(i) OCC												
TOTAL kg	91.90	100.00%	93.53	100.00%	88.61	100.00%	96.19	100.00%	94.99		100.00%	

EA: 163 Barrington Ave

MISCELLANEOUS ITEMS

NOTE: *** - NO WEIGHT RECORDED

SAMPLE #	ITEM	WEIGHT (kg)
1	vaccum bag dust	0.416
		0.416
2	ajax cleaning powder	0.236
	vaccum bag dust	0.791
	electrical wire	0.031
	light bulb (1)	*********
		1.058
3	vaccum bag dust	0.307
	electrical wire	0.092
	record player	2.800
	light bulbs (2)	*********
		3.199
4	electrical fuse glass	0.023
	lightbulb (1)	*********
		0.023
5	electrical wire	0.058
	light bulb (1)	*********
		0.058
6		
		0.000
7		
8	clock (plastic?)	0.163
		0.163
9	vaccum bag	0.430
	plastic metal valve	0.063
		0.493

Town: EAST YORK
Sampling Area: East York schools
n = : 171 – 179
Collection Dates: December 12, December 14, December 19

School Classification

SAMPLE #:	Primary 1 kg	% wt	Jr. High 2 kg	% wt	Primary 3 kg	% wt	Jr. High 4 kg	% wt	Primary 5 kg	% wt	Primary 6 kg	% wt	High School 7 kg	% wt
(1) Paper (a) Newsprint	3.800	3.86%	2.000	2.09%	6.500	6.33%	7.300	7.16%	7.100	6.90%	15.100	12.71%	6.700	6.36%
(b) Fine Paper / CPO / Ledger	10.500	10.40%	11.700	12.20%	0.600	7.68%	6.500	6.53%	6.700	6.46%	12.700	10.09%	13.000	12.35%
(c) Magazines / Flyers	1.800	1.82%	1.300	1.25%	0.500	0.56%	6.000	6.83%	0.800	0.78%	2.200	1.85%	12.300	11.80%
(d) Waxed / Plastic / Mixed	4.331	4.37%	6.600	6.88%	6.631	7.90%	6.118	6.00%	7.666	7.48%	7.537	6.44%	3.600	3.30%
(e) Boxboard	3.600	3.00%	4.200	4.38%	4.200	5.00%	2.800	2.73%	2.300	2.24%	3.400	2.86%	3.400	3.12%
(f) Kraft	12.000	12.12%	6.800	7.09%	9.700	11.58%	5.400	5.30%	6.700	6.54%	9.700	8.16%	2.500	2.18%
(g) Wallpaper														
(h) OCC	2.800	2.90%	4.200	4.38%	2.400	2.97%	5.400	5.30%	2.400	2.34%	0.721	0.61%	16.500	17.96%
(i) Tissues	11.500	11.61%	5.500	5.78%	8.600	10.51%	6.600	6.48%	5.700	5.50%	11.700	6.85%	4.300	4.08%
(2) Glass (a) Beer (i) refillable											0.292	0.25%		
(ii) non-refillable							0.007	0.80%					0.622	0.60%
(b) Liquor & Wine Containers					0.153	0.12%			0.346	0.34%				
(c) Food Containers	0.400	0.44%	0.783	0.83%	0.700	0.84%	1.000	0.98%	0.800	0.88%	0.152	0.12%	0.156	0.15%
(d) Soft Drink (i) refillable														
(ii) non-refillable			0.413	0.43%	0.634	0.76%	0.261	0.26%	0.888	0.89%	0.335	0.28%	0.107	0.12%
(e) Other Containers														
(f) Plate														
(g) Other	0.229	0.23%											0.330	0.52%
(3) Ferrous (a) Soft Drink Containers	0.150	0.15%	0.400	0.42%	0.200	0.24%	0.531	0.52%	0.260	0.32%	0.051	0.04%	0.300	0.28%
(b) Food Containers	0.300	0.30%	0.078	0.08%	0.580	0.40%	0.099	0.10%	1.098	1.07%			1.600	1.52%
(c) Beer Cans (i) returnable														
(ii) non-returnable														
(d) Aerosol Cans							0.139	0.12%						
(e) Other	0.985	0.99%	0.340	0.35%	0.031	0.04%	0.390	0.38%	2.107	2.06%	0.214	0.18%		
(4) Non-Ferrous (a) Beer Cans (i) returnable													0.400	0.38%
(ii) non-returnable														
(iii) American			0.037	0.04%										
(b) Soft Drink Containers	0.349	0.35%	1.100	1.12%	0.242	0.29%	0.800	0.78%	0.300	0.29%	0.090	0.08%	0.300	0.44%
(c) Other Packaging			0.164	0.17%					0.200	0.30%	0.087	0.08%	0.044	0.08%
(d) Aluminum	0.600	0.61%	0.500	0.51%	0.326	0.38%	0.410	0.40%	0.230	0.22%	0.257	0.22%	1.345	1.47%
(e) Other							0.045	0.04%						
(5) Plastics (a) Polyolefins	6.100	6.16%	5.500	5.73%	5.518	6.30%	6.800	6.67%	5.200	5.07%	7.000	5.92%	4.216	4.00%
(b) PVC														
(c) Polystyrene	2.190	2.21%	1.700	1.77%	1.258	1.50%	2.500	2.50%	1.478	1.44%	0.321	0.27%	2.712	2.57%
(d) ABS														
(e) PET							0.063	0.06%						
(f) Mixed Blend Plastic	0.040	0.04%			0.045	0.05%			0.094	0.09%	0.061	0.05%	0.047	0.04%
(g) Coated Plastic	0.014	0.01%	0.100	0.10%	0.113	0.13%	0.234	0.23%	0.200	0.20%	0.235	0.20%	0.013	0.01%
(h) Nylon														
(i) Vinyl											0.024	0.02%		
(6) Organic (a) Food Waste / Rodent Bedding	31.000	31.31%	42.400	44.21%	29.600	33.95%	31.500	30.91%	37.500	36.59%	40.393	34.00%	36.700	36.64%
(b) Yard Waste	*******		*******		*******		*******		*******		*******		*******	
(7) Wood	1.884	1.90%	0.178	0.10%	0.094	0.11%	0.971	0.95%	0.000	0.00%	2.114	1.78%	1.800	1.71%
(8) Ceramics / Rubble / Fiberglass / Gypsum Board / Asbestos														
(9) Diapers	0.800	0.81%			0.100	0.12%	1.300	1.28%					0.400	0.39%
(10) Textiles/Leather/Rubber	0.179	0.18%	0.213	0.22%	0.368	0.44%	1.763	1.73%	1.457	1.42%	0.451	0.38%	0.180	0.17%
(11) Household Hazardous (a) Paints / Solvents Wastes (b) Waste Oil (c) Pesticides/Herbicides														
(12) Dry Cell Batteries											0.031	0.03%	0.022	0.02%
(13) Kitty Litter														
(14) Medical Wastes											0.001	0.00%		
(15) Miscellaneous					0.083	0.10%			6.094	5.90%			1.500	1.49%
(16) BLUE BOX ITEMS (a) Newsprint									2.150	2.10%				
(b) Liquor / Wine Bottles									0.150	0.15%				
(c) Food Jars / Other Bottles	0.600	0.61%							0.750	0.73%	1.700	1.42%		
(d) Food Cans (i) ferrous	0.330	0.33%							0.100	0.10%	0.100	0.08%		
(ii) non-ferrous											0.000	0.00%		
(e) Beer Cans (i) ferrous														
(ii) non-ferrous														
(iii) American														
(f) Pop Cans (i) ferrous	0.100	0.10%							0.200	0.20%	0.600	0.50%		
(ii) non-ferrous	0.100	0.10%							0.500	0.49%	0.900	0.76%		
(g) PET Bottles											0.062	0.05%		
(h) Plastic Jugs									0.100	0.10%	0.050	0.04%		
(i) OCC														
TOTAL kg	99.08	100.00%	95.91	100.00%	83.71	100.00%	101.36	100.00%	102.50	100.00%	118.81	100.00%	100.40	100.00%

*** WEIGHT OF BLUE BOX ITEMS DIVIDED BY 8 ***
(see 5.2.4 Data Management)

	MEAN AND STANDARD ERROR ON A WEIGHT BASIS: MEAN (kg)	SE (kg)	MEAN AND STANDARD ERROR ON A PERCENT BASIS: MEAN (%)	SE (%)
(1) Paper (a) Newsprint	6.86	1.59	6.41%	62.46%
(b) Fine Paper / CPO / Ledger	10.50	0.84	10.33%	29.80%
(c) Magazines / Flyers	5.07	1.81	5.42%	72.32%
(d) Waxed / Plastic / Mixed	6.36	0.43	6.50%	14.00%
(e) Boxboard	3.50	0.47	4.00%	17.37%
(f) Kraft	7.51	1.33	7.37%	69.73%
(g) Wallpaper				
(h) OCC	5.19	2.30	5.11%	00.09%
(i) Tissues	7.73	1.13	7.80%	42.80%
(2) Glass (a) Beer (i) refillable	0.04	0.04	0.04%	1.66%
(ii) non-refillable	0.18	0.11	0.17%	4.35%
(b) Liquor & Wine Containers	0.07	0.00	0.07%	2.00%
(c) Food Containers	0.50	0.15	0.50%	5.00%
(d) Soft Drink (i) refillable				
(ii) non-refillable	0.38	0.11	0.39%	4.22%
(e) Other Containers				
(f) Plate				
(g) Other	0.10	0.06	0.09%	2.47%
(3) Ferrous (a) Soft Drink Containers	0.25	0.00	0.22%	1.80%
(b) Food Containers	0.53	0.23	0.53%	6.00%
(c) Beer Cans (i) returnable				
(ii) non-returnable				
(d) Aerosol Cans	0.02	0.02	0.00%	0.70%
(e) Other	0.61	0.26	0.60%	11.23%
(4) Non-Ferrous (a) Beer Cans (i) returnable	0.06	0.06	0.06%	2.31%
(ii) non-returnable				
(iii) American	0.01	0.01	0.01%	0.21%
(b) Soft Drink Containers	0.51	0.13	0.53%	5.16%
(c) Other Packaging	0.07	0.06	0.07%	1.26%
(d) Aluminum	0.52	0.18	0.30%	7.00%
(e) Other	0.01	0.01	0.01%	0.23%
(5) Plastics (a) Polyolefins	5.78	0.30	5.73%	12.33%
(b) PVC				
(c) Polystyrene	1.71	0.50	1.72%	11.33%
(d) ABS				
(e) PET	0.01	0.01	0.07%	0.50%
(f) Mixed Blend Plastic	0.11	0.09	0.11%	3.32%
(g) Coated Plastic	0.13	0.04	0.12%	1.42%
(h) Nylon				
(i) Vinyl	0.00	0.00	0.00%	0.14%
(6) Organic (a) Food Waste / Rodent Bedding	33.50	2.61	33.14%	******
(b) Yard Waste				
(7) Wood	1.01	0.33	0.90%	13.65%
(8) Ceramics / Rubble / Fiberglass / Gypsum Board / Asbestos				
(9) Diapers	0.43	0.28	0.43%	10.47%
(10) Textiles/Leather/Rubber	0.70	0.24	0.68%	9.42%
(11) Household Hazardous				
(12) Dry Cell Batteries	0.01	0.00	0.01%	0.18%
(13) Kitty Litter				
(14) Medical Wastes	0.00	0.00	0.00%	0.12%
(15) Miscellaneous	0.78	0.53	0.79%	23.32%
(16) BLUE BOX ITEMS (a) Newsprint	0.31	0.31	0.30%	15.42%
(b) Liquor / Wine Bottles	0.06	0.06	0.00%	0.87%
(c) Food Jars / Other Bottles	0.44	0.04	0.40%	6.77%
(d) Food Cans (i) ferrous	0.06	0.00	0.06%	1.00%
(ii) non-ferrous	0.00	0.00	0.00%	0.06%
(e) Beer Cans (i) ferrous				
(ii) non-ferrous				
(iii) American				
(f) Pop Cans (i) ferrous	0.13	0.08	0.11%	3.37%
(ii) non-ferrous	0.31	0.13	0.12%	6.37%
(g) PET Bottles	0.01	0.01	0.01%	0.66%
(h) Plastic Jugs	0.06	0.01	0.06%	0.50%
(i) OCC				
TOTAL	101.04		100.00%	

Town: EAST YORK

MISCELLANEOUS ITEMS

NOTE: *** = NO WEIGHT RECORDED

SAMPLE #	ITEM	WEIGHT (kg)
1		
2		
3	electrical wire	0.083
		0.083
4		
5	binders, boxboard, plastic, metal	5.000
	electric heater	1.094
		6.094
6		
7	electrical wire	1.500
		1.500
8		
9		

APPENDIX D

FLAME TEST AID TO IDENTIFICATION OF PLASTICS

DOW

Identifying Rigid Plastic Containers

Plastics Group, The Dow Chemical Company
2040 W.H. Dow Center, Midland, MI 48674

January 1989

This table can be used to identify the plastic used in rigid plastic containers. With only a glass of water, knife and match, anybody can determine the plastic with a very high degree of accuracy.

For example, if you put a piece of the "unknown" plastic in a glass of water and it sank, you would know the plastic was polyvinyl chloride or polystyrene (unless the container was a soft drink or miniature liquor bottle). If the plastic sank and didn't burn, then you could be assured that the bottle was produced from polyvinyl chloride.

Multi-layer, multi-component containers cannot be accurately identified by this system. However, these containers are a small percentage of the total market.

Referring to the list of "Typical Packaging Containers" on the reverse side of this page makes it even easier to identify plastics.

	Type of Plastic					
	HDPE	PET	PVC	P/P	LDPE	P/S
Weight % of bottles produced (1986) in U.S.A.	62%	24%	7%	3%	1%	Nil
Float/sinks in water	F	S	S	F	F	S
Can be transparent	NO	YES	YES	YES	NO	YES
Burns with matches[1]	YES (White Smoke, Drips)	YES (Drips)	NO	YES (White Smoke, Drips)	YES (White Smoke, Drips)	YES (Black particles, No Drips)
Rigidity	Semi-Rigid	Rigid, Tough	Semi-Rigid	Semi-Rigid	Flexible	Brittle to Semi-Rigid
Bottle surface	Rough	Usually Glossy	Very Glossy	Usually Low Gloss	Low Gloss	Glossy

[1] Use caution when striking the match and attempting to ignite the piece of plastic. Keep the glass of water handy to quickly extinguish the burning piece of plastic. Remember that burning plastic may drip. The hot droplets will burn flesh and can mar surfaces.

Recycle Plastics

APPENDIX E

PUBLISHED BTU DATA

(ref. 47)

Ultimate Analysis of Typical Municipal Refuse Components

Refuse component	C (%)	H_2 (%)	O_2 (%)	N_2 (%)	S (%)	*Inerts**	*Btu/lb*	*Percent moisture*	*Percent as delivered*
Newspapers	49.14	6.10	43.03	0.05	0.16	1.43	7.974	3.97	10.33
						1.33	8.480		
	48.34	6.13	43.30	0.14	0.11	2.96	8.266		
Brown paper	44.90	6.08	47.84	0	0.11	1.01	7.256	3.83	6.13
						1.07	7.706		
Magazine paper	32.91	4.93	38.55	0.07	0.09	23.47	5.254	4.11	7.48
Corrugated boxes	43.73	5.70	44.93	0.09	0.21	5.06	7.043	5.20	23.68
						5.34	7.429		
Plastic coated paper	45.30	6.17	45.50	0.18	0.08	3.64	7.341	4.71	0.84
						2.77e	7.703		
Waxed milk cartons	59.18	9.25	30.13	0.12	0.10	1.17	11.327	3.45	0.84
						1.22	11.733		
Paper food cartons	44.74	6.10	41.92	0.15	0.16	6.50	7.258	6.11	2.27
						6.93	7.730		
Junk mail	37.87	5.41	42.74	0.17	0.09	13.09	6.086	6.56	3.03
Tissue paper	43.9	6.1	49.0			0.93	6.999	7.00	2.18
Cardboard	43.52	6.08	44.33	0.18	0.14	5.57	7.841		
Miscellaneous paper	44.00	6.13	41.63	0.43	0.12	7.65	7.793		
Vegetable and food wastes	49.06	6.62	37.55	1.68	0.20	1.06	1.795	78.29	2.52
Citrus rinds, seeds	47.96	5.68	41.67	1.11	0.12	0.74	1.707	78.70	1.68
Meat scraps, cooked	59.59	9.47	24.65	1.02	0.19	5.11	7.623	38.74	2.52
Fried fats	73.14	11.54	14.82	0.43	0.07	0.	16.466	0.	2.53
Garbage	41.72	5.75	27.62	2.79	0.25	21.87	7.246		
Leather	42.01	5.32	22.83	5.98	1.00	21.16	7.243	7.46	0.42
Rubber composition, heel, sole catch	53.22	7.09	7.76	0.50	1.34	29.74	10.899	1.13	0.42
Plastics									
Average	78.0	9.0	13.0				15.910		0.84
High	90.0	10.0					19.303		
Low	53.8	7.0	37.2				9.580		
Polyethylene	85.6	14.4					19.950		
Vinyl	47.1	5.9	18.6 (chlorine = 28.4%)				8.830		
Plastic film	67.21	9.72	15.82	0.46	0.07	6.72	13.846		
Mixed, from municipal refuse, contaminated with food waste									
Other plastics, rubber, leather	47.70	6.04	24.06	1.93	0.33	19.72	9.049		
Paints, oils	32.1	13.1	34.8			0.	12.780		0.84
Vacuum cleaner	33.69	4.73	20.38	6.26	1.13	30.34	6.386	3.47	0.84
Evergreen trimmings	48.51	6.54	40.44	1.71	0.19	0.81	2.708	69.00	1.68
Flower, garden plants	46.65	6.61	40.18	1.21	0.26	2.34	3.697	53.94	1.68
Lawn grass, green	46.18	5.96	36.43	4.46	0.42	1.62	2.058	75.24	1.68
Ripe tree leaves	52.15	6.11	30.34	6.99	0.16	3.82	7.984	9.97	2.52
Softwood, pine	53.33	6.08	40.90	0.25	0.10	0.12	9.150		
Hardwood, oak	49.49	6.63	43.39	0.25	0.10	0.15	8.682		
Wood	49.00	6.0	42.00			2.28	6.840	24.00	2.52
	48.30	5.97	42.44	0.29	0.11	2.89	8.236		
Grass and dirt	36.20	4.75	26.61	2.10	0.26	30.08	6.284		
Rags	43.9	6.1	49.0			0.93	6.999	7.00	0.84
Textiles	46.19	6.41	41.85	2.18	0.20	2.17	8.036		
Dirt						100.00			1.68
Glass bottles	0.52	0.07	0.36	0.03		99.02	84		
Btu in labels, coatings, and remains of contents									
Glass, ash, ceramics						100.000			8.50
Glass, stones, ceramics			(same as above, glass bottles)						
Metal cans	4.54	0.63	4.28	0.05	0.01	90.49	742		
Btu in labels, coatings, remains of contents									
Metals						100.00	2.660		7.53

**Inerts—ash, glass, metal, stone, ceramics. Source: Compiled in Ref. 15.*

(ref. 50)

RELATIVE ENERGY VALUES FOR COMBUSTIBLES
(Btu per Pound)

Material	Value
Residual fuel oil	20,900
Plastics	
Polyethylene	19,900
Polypropylene	19,850
Polystyrene	17,800
Polyurethane	11,600
Coal	11,500
Rubber	10,900
Newspaper	8,000
Leather	7,200
Corrugated boxes (paper)	7,000
Textiles	6,900
Wood	6,700
Average for MSW	4,650
Yard waste	3,000
Food waste	2,600

APPENDIX F

WHITE GOODS AND BULK ITEMS GENERATION RATE DATA

Town: Oakville

Population (1985)[1] : 83,214
Population (1988) : 98,404

Year	White Goods (tonne)	Generation Rate (t/capita/year)
1984	115	0.0014
1985	100	0.0012
1986	106	0.0013
1987	185	0.0019
1988	258	0.0026
1989	256	0.0026

[1] all population data taken from the Ontario Municipal Directory

Town: Etobicoke

Population (1985): 298,490
Population (1988): 293,433

Year	White Goods (tonnes)	Generation Rate (t/capita/year)
1986	325	0.0011
1987	331	0.0011
1988	335	0.0011
1989	391	0.0013

Town: Toronto

Population (1988): 597,126

Year	White Goods (tonne)	Generation Rate (t/capita/year)
May - December		
1987	223.0	0.0006
1988	324.6	0.0005
1989	1088.7	0.0018

Town: City of York

Population (1988): 131,537

Year	White Goods (tonnes)	Generaton Rate (t/capita/year)
1989	260	0.0020

Town: Ajax

Population (1988): 45,046

Year	White Goods (tonnes)	Generation Rate (t/capita/year)
1989	65	0.0014

Town: North York

Population (1988): 544,560

Year	White Goods[1] (tonnes)	Generation Rate (t/capita/year)
1988	330[1]	NA
1989	1100	0.0020

[1] Only part of the city provided with separate white goods collection

Town: East York

Population (1988): 96,497

Year	White Goods (tonnes)	Generation Rate (t/capita/year)
1989	150	0.0016

Town: Mississauga

Population (1988): 385,156

Year	White Goods (tonnes)	Generation Rate (t/capita/year)
1989	150.9	0.0004

Town: Whitby

Population (1988): 49,948

Year	White Goods (tonnes)	Generation Rate (t/capita/year)
1989	175	0.0035

County: Wellington

Population (1988): 62,992

Year	White Goods Generated
1989	480 cu.yd./year (approximately)

Town: Toronto

Population (1985)[1] : 606,247
Population (1988) : 597,126

Year	Other Bulk Items (tonnes)	Generation Rate (t/capita/year)
1984	17597.7	0.029
1985	17534.8	0.029
1986	18882.6	0.031
1987	18887.4	0.032
1988	15078.2	0.025

[1] All population data taken from the Ontario Municipal Directory

Town: Etobicoke

Population (1985): 298,490
Population (1988): 293,433

Year	Other Bulk Items (tonne)	Generation Rate (t/capita/year)
1986	1517	0.005
1987	1300	0.004
1988	1283	0.004
1989	1261	0.004

Town: Oakville
Population (1988): 98,404

Year	Other Bulk Items (tonnes)	Generation Rate (t/capita/year)
1989	1172	0.012

Town: Whitby
Population (1988): 49,948

Year	Other Bulk Items (tonnes)	Generation Rate (t/capita/year)
1989	705	0.014

APPENDIX G

GLOSSARY OF TERMS

GLOSSARY OF TERMS

ABS---acryl butyl styrene; a dense plastic found in, e.g., computer housings, telephone casings, pipe;

absorb---(in the sense used in the present report) the uptake or penetration of water or other solvent into the interstices of a chemical matrix, i.e., not unlike the uptake of water by a dry sponge;

accuracy---in a statistical sense, the term gives an indication of the closeness of the results, estimates, etc. to the "true" value.

adsorb---the adherence of water or solvent to the surface of an object, without penetration into the "interior", ie., a 'film' of moisture;

BTU---British Thermal Unit; the amount of heat required to raise the temperature of 1 pound of water 1 Fahrenheit degree ; in this case, the "potential energy" or the amount of heat that would be released from the material if it were to be burned (usually rated calories per unit weight of material - SI units: kiloJoules per kilogram);

commercial wastes---discarded materials generated by commercial businesses as a result of normal activities in the workplace;

ferrous---a metal object containing elemental iron, giving a 'positive' or attractive response to a magnet;

MSW---municipal solid waste, usually defined as the sum of residential and commercial solid wastes, and excluding industrial wastes;

non-ferrous---a metal object which does not give a 'positive' or attractive response to a magnet, e.g., copper, brass, lead, aluminum, etc.

OCC---old corrugated containers; variously called, old corrugated cardboard;

PET---polyethylene terephthalate; the plastic used to manufacture the common 2 litre pop bottles;

polyolefin---in the sense used here, a grouping of chemically related plastics whose chemical building blocks are either ethylene or propylene;

precision---in a statistical sense, the term gives an indication of the <u>repeatability</u> of a series of observations, estimates, etc. The Standard Error is one kind of estimate of the precision or repeatability or "tightness" of the grouping of the observations (= data);

putrescible---a material which is biodegradable; usually a term reserved for animal or vegetable matter;

PVC---polyvinyl chloride; a plastic containing chlorine; well known as siding, plastic window sashes and frames, pipe and a few rigid containers;

residential waste---discarded materials generated by individuals in the course of their daily activities at their place of residence; in this case, exclusive of yard wastes and leaves;

tare weight---the weight of an empty container;